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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII — CLEVELAND, OHIO, JUNE 30, 1904 — NUMBER 26

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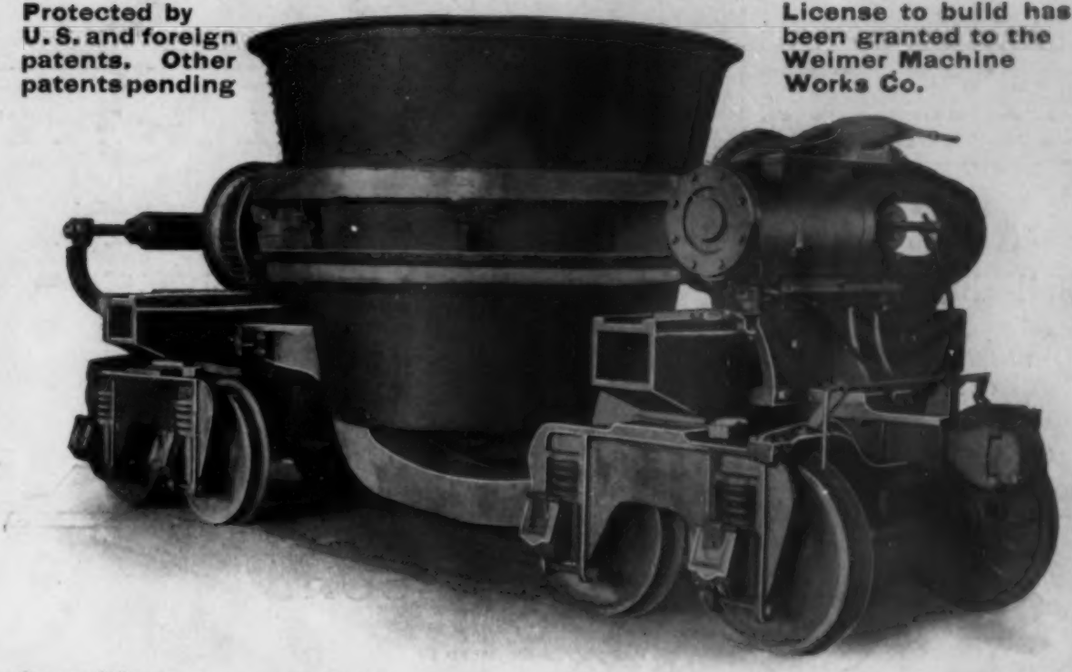

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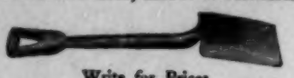

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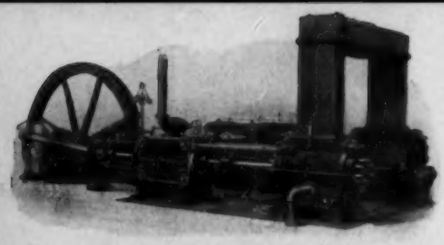

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, JUNE 30, 1904 NUMBER 26

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The first half of 1904 ends with a restrictive movement under way in the iron trade that promises to bring pig iron production back to the February basis, when the output was at a yearly rate of less than 15,000,000 tons. The extent of shut downs of rolling mills and steel works on July 1 and the length of the idle period cannot be fully determined at this writing, but will be considerable. Scale disagreements will cause some interruption, particularly in sheet and tin plate mills, and to some extent in bar mills. But there is a disposition among blast furnace operators to prevent the accumulation of their product, so that the idleness of the mills will not necessarily mean further weakening in the pig iron market.

A scale agreement was reached by the American Sheet & Tin Plate Co. in the week on a basis of 18 percent reduction from last year's scale, which leaves wages as they have been since the special April conference. The rebate question is still undecided, however. Independent sheet manufacturers want a 20 percent reduction, and are still in conference with the workers. The non-union mills of the leading interest are the disturbing factor, and the possibility of the idleness of all union sheet and tin plate mills for some weeks is not remote. The Republic Iron & Steel Co. will close most of its mills for a part of July at least. At Joliet, Ill., the rod mill department has closed down and further suspensions there are expected. The National Tube Co. will close down some of its mills for urgent repairs, but has plenty of orders. A number of American Steel & Wire Co. plants, as well as independent wire plants in Pittsburg and Ironton districts, will be out in early July. The hoop and bar mills of the Carnegie Steel Co. are expected to be off for a time, the scale being still unsigned. With not a few mills there is no pressing necessity for running on and the mid-year inventory and repairs are opportune. In the Central West a few more blast furnaces have gone out and there is an evident adjustment to the requirements of a quiet summer.

In spite of these general preparations for curtailed output, there has been more than a fair volume of inquiry for pig iron and for steel products in the past week. If anything like the full tonnage represented in inquiry were realized in orders the activity would be marked. The pig iron situation gives token of more life, and the proportion of inquiry resulting in business is probably greater than in finished material. A radiator interest took 5,000 tons, largely from Southern furnaces, the basis being $9 for No. 2 iron. A pipe works contract for 5,000 tons was closed and the leading cast iron pipe interest is expected to contract soon. A 2,000-ton sale to a wrought pipe interest, 1,000 tons to a car company and 2,500 tons to a St. Louis merchant pig iron interest are also reported. The larger consumers of pig iron seem more willing to do business than the small consumers. In the Pittsburg district Bessemer iron has sold at $12.60 delivered, and $11.60 at furnace is possible. Basic iron and gray forge have made new low records for the present year in Pittsburg buying. Southern producers are kept by the pending negotiations with coal miners from selling much iron for forward delivery at present prices and $9.25 is being quoted for No. 2 in some cases, though $9 is the common price.

The meetings of the billet, plate and structural steel producers next week cause some speculation as to prices; but in spite of cuts in billets and plates, no change is looked for in official prices. The statement that the Buffalo plant will sell structural steel independently of the beam pool may make some difference in the status by early fall. Low prices on sheets have been reported in the past week the low record being broken in a sale to a roofing interest at 2c for No. 28.

Exports of steel in May show a markd increase over April, chiefly due to the bounding up of rail exports which were 41,000 tons in May, or 3,000 tons more than for the first four months of the year. Steel billets and sheet bars are lower in English markets, German producers independent of the steel syndicate having sold as low as 79 shillings, Manchester.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, June 29.

The iron, sheet and tin plate scales for the year beginning July 1 have not yet been arranged with the Amalgamated Association, although the present scale expires on Thursday. To what extent the mills will be shut down is not yet known, but it is pretty certain that the Amalgamated mills of the American Sheet & Tin Plate Co. will close at midnight Thursday and some of the independent mills will also shut down. This week the officials of the Amalgamated Association notified the iron, sheet and tin plate manufacturers that they could continue the operation of their plants after the expiration of the present scale, the wages to be governed by those that will be adopted by conferences to be held later in the summer. A number of independent manufactures have already notified the association that they would accept this proposition and will continue to operate their plants awaiting an adjustment of the scale. Nothing official can yet be learned with reference to the shutting down of the iron mills of the Republic Iron & Steel Co. and the Carnegie Steel Co., although it is probable that the former will continue to operate a few of its mills after the first of the month on this plan, while the Carnegie Steel Co.'s iron mills will be shut down.

The sheet and tin plate scale after a week's conference with the American Sheet & Tin Plate Co. has not yet been adjusted. The workers have agreed to an 18 percent reduction from the scale signed one year ago and a few changes have been made in the foot notes, the scale being the same as that under which the sheet and tin mills are now operating and which was adopted last April. However, the Amalgamated Association insists on the termination of the rebate agreement, while the American Sheet & Tin Plate Co. will not sign the scale without its incorporation. The last conference with the American Sheet & Tin Plate Co. was held on Monday, and yesterday the wage committee of the Amalgamated Association met with the Independent Sheet Manufacturers' Association. After the conference with the independents another meeting is to be held with the officials of the sheet and tin plate consolidation. Neither the manufacturers nor the workers have yet asked for another conference to adjust the iron scale. Next week will find nearly all of the plants of the American Steel & Wire Co., not only in this district, but throughout the country in idleness, while one independent plant at Ironton and the Pittsburg Steel Co. at Monessen will also shut down. The Mingo Junction plant of the Carnegie Steel Co. is again in operation after a brief idleness, while the report that the Bellaire steel works and furnaces have been shut down is unfounded. It is also denied that the Bessemer plant of the Carnegie Steel Co. at Youngstown will shut down this week as reported. From present indications there is no intention of shutting down this plant for some

time. The Jones & Laughlin Steel Co. will continue to operate its plant at about the same capacity as at present, although a large number of smaller plants in this district will be shut down the greater part of July.

Next Wednesday the billet manufacturers will hold their quarterly meeting in New York, and from what can be learned at present, ruling quotations will again be reaffirmed. These prices are to be maintained despite the sales that are being regularly made by some manufacturers of sheet and tin bars and billets from $2 to $3 per ton below the agreed quotations. Meetings of the plate and structural manufacturers will also be held on Thursday, and prevailing quotations will be reaffirmed without doubt.

One merchant furnace at Sharpsville was blown out in the week and two stacks at that place are preparing to go out early in July. One Edgar Thomson stack has also been placed on the idle list. On the other hand, three Mingo Junction stacks, which were banked for a few days, are again on in full. The tremendous curtailment of pig iron producing capacity has not stayed the downward tendency of the market and lower prices are prevailing. On an order for 1,000 tons of basic iron $12.25 Pittsburg was done, while Bessemer is quoted by a few producers at $11.75 at the furnace. On forge iron $12.35 Pittsburg is the maximum for high prade product, while ordinary iron can be had for $12.15. Southern forge is held at $12.35 Pittsburg, but $12.10 can be done from furnaces having a lower rate than the Birmingham stacks. This is equivalent to $7.75 Birmingham, although none of the furnaces in that district are willing to meet this competition.

During the past few days inquiry has been heavier for finished material than at any time this month, but consumers are only asking for prices on small lots for immediate shipment, not being interested in third quarter deliveries. The largest order for structural material closed during the week was taken by the American Bridge Co. and calls for 2,500 tons of material for the South Side elevated tracks of the Wabash railroad.

A large tonnage of black sheets, one pass, box annealed, is reported sold to a roofing concern on the basis of 2 cents for No. 28 gauge.

Pig Iron.—The entire Northern market has settled down to a lower basis during the week. While $12.85 has been secured for high grade No. 2 for third quarter delivery, ordinary No. 2 has sold at prices ranging from $12.50 to $12.65. On forge iron the maximum is $12.35 Pittsburg, and we note the sale of 500 tons at this price, while ordinary grades can be had as low as $12.15. We also note the sale of 1,000 tons of basic at $12.25 delivered at a point taking the regular Pittsburg freight. This is by far the lowest price yet named on this iron. On Bessemer $12.60 Pittsburg can be done, and this price could no doubt be shaded on a desirable tonnage. Several hundred tons of Virginia basic for July delivery were sold on the basis of $13.30 Pittsburg. Mabel furnace of M. A. Hanna & Co. at Sharpsville has been blown out, while two other merchant stacks at that place will go out the second week in July. One Edgar Thomson stack has also been placed on the idle list, and the stack of the Kittanning Iron & Steel Co. at Kittanning, Pa., is to go out this week for extensive repairs. We revise quotations as follows:

Bessemer, Valley	$11 60 to 11 75
Bessemer, Pittsburg	12 45 to 12 60
No. 1 Foundry	13 00 to 13 25
No. 2 Foundry	12 60 to 12 85
Gray forge, Pittsburg	12 15 to 12 35
Chilled basic, Valley	11 40 to 11 50
Chilled basic, Pittsburg	12 25 to 12 35

Steel.—The quarterly meeting of the billet association will be held in New York next Wednesday, and there is every indication that prices will be reaffirmed. These agreed prices by no means represent the market, however, as we note the sale of 500 tons of Bessemer billets for Cleveland delivery at $21, while sheet bars are offered in this market at $22.25. The Mingo Junction Bessemer plant of the Carnegie Steel Co. is again in operation after a brief idleness, while there is no intention of shutting down the Bessemer plant at Youngstown on July 1, as reported, and the report that the Bellaire plant is idle is untrue. Little foreign business in billets, sheet and tin bars is being taken by the United States Steel Corporaton, the export trade being exceedingly quiet. Lower prices are also ruling which both the American manufacturers and the German steel syndicate refuse to meet. As low as 79 shillings delivered in the Manchester district has been done by German steel manufacturers outside of the syndiicate, which is a drop of about three shillings from the prices of about a month ago. Agreed quotations are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs up to and including 0.25 carbon, $23, Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30 to $31 Pittsburg.

Ferro-Manganese.—The market continues quiet and quotations on domestic ferro, 80 percent, are nominally $41.50 to $42, delivered at buyer's mill, east of the Mississippi.

Spelter.—The spelter market is somewhat stronger and prices have again advanced. Prime Western grades are sold at 4.83½c to 4.85c, in carload lots, Pittsburg.

Muck Bar.—The market is quiet and quotations are merely nominal and range from $24 to $24.50.

Skelp.—The skelp mills continue to operate in full owing to the activity in the pipe trade. Steel skelp, both grooved and sheared, is held at 1.35c to 1.40c, while grooved iron is held at 1.45c and sheared at 1.50c to 1.52c.

Rails and Track Material.—The market continues quiet and mills continue to operate on orders placed during the past six months. The light rail trade is quiet and low prices continue to rule. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 25 pounds, $22.50 to $23.50; 25 to 40 pounds, $20 to $21.50. Track material: Spikes, 1.65c to 1.70c.

Plates.—Demand for plates, mostly in small lots, however, has been better during the past week than for some time. The plate mills of the Carnegie Steel Co. are operating double turn on plates for the steel car manufacturers. Next Thursday the plate manufacturers meet in New York, but despite the cutting on the part of mills outside of the association, there is no indication that prices will be reduced. Prevailing quotations are as follows: Tank plates, ¼ inch thick and up to 100 inches in width 1.60c at mill Pittsburg; flange and boiler steel, 1.70c marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c; and it ranges in price to 3c. Plates, more than 10 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

Bars.—The market in both iron and steel bars continues quiet. Most of the iron bar mills will shut down next week and will be idle during the greater part of July. Iron bars are held on the basis of 1.30c Pittsburg, although 1.25c can be done on desirable business. We make the following quotations: Bar iron, 1.25c to 1.30c Pittsburg for local delivery, while for Western shipments quotations are based on 1.25c to 1.35c Pittsburg. Hoops are held at 1.55c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open-hearth, 1.40c; plow beams and cultivator beams, 1.35c net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size, not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Pipe and Tubes.—Another reduction on merchant pipe is looked for by the trade on July 1, owing to the large amount of cutting which has been done thus far this month. On large pipe the market continues strong and all of the mills are on in full. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are revised as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	69	59	66	56
½ inch	72	62	69	59
¾ to 6 inch	76	66	73	63
7 to 12 inch	71	61	68	58
Ex. stg., plain ends, ⅛ to 8 in.	68	58	64	54
Double ex. stg., pl. ends, ⅛ to 8 in.	60	50	56	46

BOILER TUBES.

	Steel.	Iron.
1 to 1½ inch	42½	30
1¾ to 2¼ inch	55½	38
2½ inch	58	43
2¾ to 5 inch	64½	50½
6 to 13 inch	55½	38

Structural Material.—The American Bridge Co. was awarded the contract for the erection of the South Side elevated branch of the Wabash railroad, for which about 2,500 tons of steel will be required. We make the following quotations: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—A number of the sheet mills of the American Sheet & Tin Plate Co. are idle and the market generally is in a demoralized condition owing to the concessions that are being made. On black sheets, 28 gauge, as low as 2.10c is being done in carload lots. Our quotations on black sheets in carload lost and over are as follows: Black sheets, No. 8, 1.60c to 1.65c; No. 9, 1.65c to 1.70c; Nos. 12-14, 1.70c to 1.75c; Nos. 15-17, 1.80c to 1.85c; Nos. 18-21, 1.90c to 1.95c; Nos. 22-24, 1.95c to 2c; Nos. 25-26, 2c to 2.05c; No. 27, 2.05c to 2.10c, No. 28, 2.15c to 2.20c; No. 29, 2.45c to 2.50c; No. 30, 2.55c to 2.60c. Galvanized: Nos. 12-17, 2.25c to 2.30c; Nos. 18-21, 2.40c to 2.45c; Nos. 22-24, 2.55c to 2.60c; Nos. 25-26, 2.75c to 2.80c; No. 27, 2.95c to 3c; No. 28, 3.15c to 3.20c; No. 29, 3.50c to 3.60c; No. 30, 3.90c to 4c.

Wire and Wire Nails.—The market is in a very quiet condition, and the majority of the mills will be idle next week for the entire month of July. Concessions of $2 per ton are reported on wire and nails, and the trade anticipates lower prices on the 1st. We quote as follows: Wire nails, carload lots to jobbers f. o. b. cars Pittsburg, are quoted $1.90 base; plain wire, carload lots, $1.80 base; barb wire, carload lots, $2.20 base; staples, carload lots, $2.05 keg. Galvanized 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.75, and less than carload lots, $1.80 f. o. b. Pittsburg, plus freight to point of destination. Terms, 60 days less 2 percent off in 10 days.

Merchant Steel.—The market continues quiet, and a number of the steel mills in this district will shut down on Saturday night for the greater part of July. Prices are weak. We quote: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.55c to 1.60c; plow steel, 6 inches and under, 1.35c for Bessemer and open-hearth; plow slabs, ¾ inch and heavier, 1.60c. The demand for shafting on the part of the machinery manufacturers is not heavy, and tonnage has therefore been considerably affected. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Old Material.—The market continues exceedingly quiet and the dealers are doing all the buying at extremely low prices. Our quotations, gross tons, are as follows: Old steel rails, $11.25 to $11.50; old car wheels, $11.75 to $12; iron axles, $14.75 to $15; heavy melting scrap, $11 to $11.50; low phosphorus melting scrap, $14.75 to $15; sheet scrap, $7 to $7.25; No. 1 wrought and No. 1 railroad scrap, $11.75 to $12, net tons; cast scrap, $9.

Coke.—On furnace coke for Eastern shipment during the last half of the year $1.40 has been done on strictly Connellsville product. Western furnaces are not inquiring for last half delivery, and producers are not inclined to go below $1.45 for shipments to the West. On foundry coke $1.85 is being quoted for strictly Connellsville, while lower grades are held at $1.65 to $1.70. In the upper and lower Connellsville region there are approximately 7,000 ovens idle, of which the United States Steel Corporation subsidiary companies control 4,500. During the week ending Saturday, June 18, the production of the upper region amounted to 185,119 tons and that of the lower region to 54,882 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, June 28.

There is a rift in the dark clouds that have hung over this market, and sellers of iron and steel products are today entertaining a more hopeful opinion regarding the situation. This improvement, while not reflected in any notable increase to the tonnage on mill books, is seen largely in the volume of inquiry that has sprung up in the past week, which, in view of the conditions that have existed for so long, is worthy of special comment. Though inquiry has been encouraging, the flexibility of prices on those materials in more general demand has done much to suppress any inclination toward buying heavily which the consumer might have had when he first let his wants be known. The local situation may be summed up in the statement that consumers are sounding the market on large tonnages, while for the present buying only in small lots. This is particularly true of pig iron. Many contracts will expire by the end of this month and melters not covered beyond this date are keeping in close touch with their furnaces and asking bids on requirements for three to six months. The market is still at $9 Birmingham for No. 2, though a number of the furnaces hold quotations at $9.25. The probable shut down of sheet and tin plate mills for summer repairs and pending the signing of the new wage scale, has stimulated specifications, and local sellers of sheets report a gratifying increase in same. New business, however, is light, and the schedule based on 2.20c Pittsburg for No. 28 gauge is shaded from $1 to $2 a ton, according to the nature of the business. Bar iron is also weaker by $1 a ton; while steel bars are being sold by the local implement interest at 1.40c Chicago—$2 a ton below association prices. Some plate mills are quoting $2 a ton below "official" prices on plates 48 inches wide and under, though on universal sizes the market is well sustained. Light rails are weak as a result of the active competition among producers for the business being offered. On the other hand, angle bars, spikes, and bolts are meeting with a brisk demand, the local interest reporting heavy sales this month. A new schedule on boiler tubes was placed in effect last week, which is substantially 10 percent lower than the one preceding it. Business in tubes is very light, which is true also of merchant pipe. Reports are frequent that independent producers of the latter material are shading prices to attract business. The demand for cast iron pipe shows an improvement, the Los Angeles contract for 2,500 tons having been let within the week under review. It is expected the Cincinnati contract for 14,000 to 18,000 tons will be closed up next Friday. Heavy material, such as billets, structural steel, plates and rails, is in a dormant condition, though specifications against existing contracts keep up to favorable proportions. A large amount of building construction is under way in this city, and it is estimated by a local paper that $40,000,000 will be spent this year in local improvements. Since the first of the year, city permits have been issued for the erection of 2,483 buildings, involving an estimated cost of $13,409,310. Railroad trade is without any improvement, and the tonnage from this source keeps very light. There is some demand for scrap iron on local dealers, but prices remain weak and of a downward tendency. Trading in coke is light in sympathy with the conditions ruling in pig iron, and prices are without any material change.

Pig Iron.—While $9 iron may still be obtained from some of the smaller and less known furnaces, one of the leading Southern interests which had been quoting $9 advanced its schedule today to the basis of $9.25, after having sold its entire stock on hand as well as considerable of its output for the next three months at the former figure. In Northern irons one of the local producers has advanced its minimum to $13.50 Chicago for No. 2. Buying of both Northern and Southern irons in the past week has been much freer than for some time past, while the inquiry keeps up to good proportions. Many contracts will expire this month, and sellers confidently look for a buying movement in July covering needs for the ensuing quarter or last half. Furnaces, however, are holding the tonnage down, not feeling disposed to sell at present prices for deliveries beyond September, and are asking 25 cents to 50 cents a ton higher where the melter insists on making a contract for iron to be shipped during the balance of the year. Some confusion exists in regard to the proposed change in freight rates between Birmingham and the North, and while some roads have already announced that the 20-cent advance would go into effect July 1, not all the companies are in favor of any change at the present time. A meeting of the traffic officials of the various roads is to be held in the near future, and a

definite plan of action agreed upon. We note a drop of 50 cents a ton in Ohio strong softeners, while gray forge is 25 cents lower. Our quotations are as follows:

Lake Superior Charcoal	$14 50 to 15 00
Northern Coke Foundry No. 1	13 75 to 14 00
Northern Coke Foundry No. 2	13 25 to 13 50
Northern Coke Foundry No. 3	13 00 to 13 25
Northern Scotch Foundry	14 25 to 14 50
Ohio Strong Softeners No. 1	14 80 to 15 30
Ohio Strong Softeners No. 2	14 30 to 14 80
Southern Coke Foundry No. 1	13 15 to 13 40
Southern Coke Foundry No. 2	12 65 to 12 90
Southern Coke Foundry No. 3	12 40 to 12 65
Southern Coke Foundry No. 4	12 15 to 12 40
Southern No. 1 Soft	13 15 to 13 40
Southern No. 2 Soft	12 65 to 12 90
Southern Gray Forge	11 90 to 12 15
Southern Mottled	11 90 to 12 15
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	14 00 to 14 50
Alabama Basic	13 15 to 13 40
Virginia Basic	14 40 to 14 65

Billets.—Transactions in this product in this market are few and invariably for small tonnages. We continue to quote association prices for Bessemer and open-hearth billets, 4x4 and larger, up to .25 carbon, $24; up to and including .60 carbon, $1 extra; over .60 carbon, $2 extra. Billets, 3⅞ inches and smaller, and sheet and tin bars, $25. Open-hearth billets from store, $1.30 per 100 lbs.

Iron and Steel Bars.—Reports of some low prices made on bar iron in this city are current, and the local market has suffered as a consequence. There is little demand, however, except in the way of specifications, and these continue active. Some new business in steel bars is being taken by the local implement interest, which is shading the association price $2 a ton. A large tonnage in specifications for this product has been received for shipment after July 1. Small angles are fairly active. Hoops are quiet. We quote as follows: Bar iron, 1.30c to 1.35c, base, half extras; soft steel bars, 1.40c to 1.51½c, half extras; soft steel angles, less than 3x3, 1.61½c; hoops, 1.71½c. On lots from store, we quote: Iron bars, 1.75c base, full extras; steel bars, 1.70c to 1.80c, base, half extras; hoops, 2c to 2.10c rates, full extras.

Sheets.—While many independent mills are reported full of business and declining further orders, there is sharp competition between other outside mills and the leading interest for the business offered. Prices are weak, and the schedule based on 2.20c Pittsburg for No. 28 gauge is being shaded $2 a ton. A large number of specifications have been received by mills within the past week for immediate shipment, the contemplated shut down of a number of mills for summer repairs and pending the settlement of the wage scale being the stimulus. We have revised our prices, and quote as follows: For one pass, cold rolled, blue-annealed sheets, mill shipments, Chicago delivery: Nos. 8 and 10, 1.79½c; Nos. 11-12, 1.81½c to 1.86½c; Nos. 13-14, 1.86½c to 1.91½c; Nos. 15-16, 1.91½c to 2.01½c. On box annealed, one pass, cold rolled: Nos. 18-20, 2.06½c to 2.11½c; Nos. 22-24, 2.11½c to 2.16½c; Nos. 25-26, 2.16½c to 2.21½c; No. 27, 2.21½c to 2.26½c; No. 28, 2.31½c to 2.36½c; No. 29, 2.46½c to 2.51½c; No. 30, 2.56½c to 2.61½c. Store trade is brisk and a good volume of business has been booked by local jobbers within the week past. Prices have been reduced $2 a ton, and we now quote as follows: No. 10 and heavier, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; No. 18, 2.30c to 2.40c; No. 20, 2.30c to 2.40c; No. 22, 2.35c to 2.45c; No. 24, 2.40c to 2.50c; No. 26, 2.50c to 2.60c; No. 27, 2.60c to 2.70c; No. 28, 2.70c to 2.80c; No. 29, 2.85c to 2.95c. Galvanized sheets are quiet, and we quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipments from local store, 75, 10 and 5 to 80 percent.

Structural Steel.—Demand from warehouse stocks continues to be quite brisk, but aside from this feature there is nothing of interest to chronicle. We quote association prices, car lots, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3x3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3x3 and larger, 2c; beams, 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—The demand for universal plates keeps improving, though on lighter gauges business is not so good. Some mills are naming prices $2 a ton below the association on plates 48 inches wide and under. We quote carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c; marine, 1.96½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch, 1.86½c; Nos. 7 and 8, 1.91½c; No. 9, 2.01½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel, ¼-inch and heavier, 2c; 3-16, 2.10c; No. 8, 2.15c; No. 10, 2.15c; flange steel, 2.25c, all f. o. b. warehouse.

Rails and Track Supplies.—There is considerable competition among producers of light rails, and some low prices have been made in this market. The local interest needs the tonnage and is sacrificing profits to keep its mill in continual operation. Track supplies have been in brisk demand during the week and good sized orders and specifications have been booked. Transactions in heavy rails are of only a nominal character. There is a plenty of inquiry, but little of it results in business. Our prices given below on light rails and track supplies may be shaded about $1 a ton on desirable business. We quote heavy sections, mill shipments, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $23 to $25; track supplies, f. o. b. Joliet mill: angle bars, 1.35c to 1.45c; spikes, first quality, 1.65c to 1.75c; track bolts, 3½x¾, with square nuts, 2.20c to 2.30c per 100 lbs.; with hexagon nuts, 2.35c to 2.45c.

Merchant Steel.—New business keeps coming forward each week, and specifications also show an improvement. No change is reported in prices, and we continue to quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 2c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.30c and upward, according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Cast Iron Pipe.—The principal contract of the week was one of 2,500 tons let by the municipality of Los Angeles, although a fair number of smaller ones, aggregating a good round tonnage was closed. The Cincinnati contract which is for 14,000 tons, is expected to be let this week. Prices are unchanged, and we quote 4-inch water pipe, $26; 6 to 12-inch, $25; larger sizes, $24.50; gas pipe, $1 a ton higher.

Merchant Pipe.—New business remains quiet, and much talk is heard of the lower prices being made by independent interests. No change in the quotations of the leading interest has been made, however, and we continue to quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inch	67.35	57.35	64.35	54.35
⅜ inch	70.35	60.35	67.35	57.35
½ to 6 inches	74.35	64.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ percent advance.
Stove discounts are unchanged, as follows:

Boiler Tubes.—A fair tonnage is sold each week by local jobbers, but there is yet room for much improvement. A new schedule of prices, approximately about 10 percent less than the preceding list, was put into effect last week. We have revised our quotations, and name on carload lots, mill shipments, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	46.35	41.35	52.35
1¾ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	Up to 4 inches.
6 to 13 inch	58.35	41.35	50.85

Wire Products.—The demand for nails and wire shows an improvement, and season considered, the trade is as good as could be expected. The leading producer affirms it is adhering strictly to its schedule. We quote to job-

bers, carload lots, Chicago delivery, as follows: Wire nails, carload lots, $2.10; less than carload lots, $2.15; cut nails, carload lots, 1.91½c base; less than carload lots, 1.96½c; smooth wire, carload, $2, and $2.05 for less than carload lots; galvanized smooth wire, $2.30 in carloads and $2.35 in lesser amounts; painted barb wire, $2.40 carloads, and $2.45 in less than carload lots; galvanized barb wire, $2.70 carloads, and $2.75 less than carload lots. Staples, polished, carloads, $2.25; less than carload lots, $2.30; galvanized, $2.55 carloads and $2.60 less than carload lots. Bale ties, 82½ and 5 percent discount, f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or De Kalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—The market is quiet, though prices show increasing strength. For future deliveries, good 72-hour grades, whether Connellsville or Southern, are bringing from $1.75 to $2 at the ovens.

Old Material.—Generally speaking, the market is without material change. Some tonnage is in demand for consumption in mills, and there is also a fair buying movement for light cast scrap. Prices remain weak, and if anything, material could be bought at 25 cents a ton less than quoted in the column below. On gross tons, our quotations are as follows:

Old iron rails	$14 50 to 15 00
Old steel rails (4 feet and over)	11 00 to 11 50
Old steel rails (less than 4 feet)	9 50 to 10 00
Relaying rails, subject to inspection	23 00 to 24 00
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 50 to 12 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 00 to 7 50

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	12 00 to 13 00
No. 1 R. R. wrought	10 50 to 11 00
No. 2 R. R. wrought	9 00 to 9 50
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	8 00 to 8 50
Wrought pipe and flues	7 50 to 8 00
No. 1 cast, 150 lb. and less	9 25 to 10 00
Heavy cast	7 75 to 8 25
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	7 50 to 8 00
Boiler punchings	9 00 to 9 50
Iron car axles	15 00 to 15 50
Steel car axles	13 50 to 14 00
Iron axle turnings	7 00 to 7 50
Steel axle turnings	7 00 to 7 50
Cast borings	3 00 to 3 50
Mixed borings, etc.	3 00 to 3 50
Wrought turnings	6 00 to 6 50
Machine shop turnings	6 00 to 6 50
Railroad malleable	8 25 to 8 75
Agricultural malleable	7 75 to 8 00
Stove plate and light cast scrap	7 25 to 7 75
Old iron splice bars	12 00 to 12 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, June 29.

The market continues quiet, but the failure of buyers to place orders does not cause much reduction of prices. In the present period of depression there is evidence that many concerns are in better financial condition than they were in previous times when business was dull. Hence they are more independent. Companies which in past years feared that a temporary suspension would be accepted as proof of bankruptcy are now so well fixed financially that they do not find it necessary to keep in operation to show their financial stability and will close rather than run at a loss.

Iron Ore.—Some sales have been made at prices quoted last week; viz., old range Bessemer, $3.25; old range non-Bessemer, $2.65 to $2.80; Mesabi Bessemer, $3; Mesabi non-Bessemer, $2.40 to $2.65. Vessels at the northern ports are not being loaded rapidly, as shipments from mines to ports have been made slowly. Last year, the contract rates for freight were 85 cents from the head of the lakes, 75 cents from Marquette and 65 from Escanaba. Within a few days, contracts have been signed at 70 cents from the head of the lakes, 65 cents from Marquette and 55 cents from Escanaba, and, although such contracts are reluctantly made by vesselmen, it does not seem probable that freight rates will be higher.

Pig Iron.—Efforts of buyers to place orders for Southern iron at less than $9 Birmingham for No. 2 have not been successful and the market is firm at $9 as the usual price, while some furnaces decline to sell at less than $9.25. Southern sales agents report that there is some inquiry for the third and fourth quarters, but Northern dealers say buyers manifest no interest in the market except for immediate delivery. The policy of curtailment will be continued until conditions become more favorable. The Struthers Furnace Co. has decided to blow out its furnace at Struthers, O., as soon as the present supply of ore is exhausted, which will be in about two weeks. In the Valley, the price ranges from $11.75 to $12 for No. 2 foundry, while Bessemer sells at $12 and basic at $11.80 to $11.90. We quote as follows for Cleveland delivery except gray forge, which is at Valley furnace:

Bessemer	$12 60 to 12 75
No. 1 Strong Foundry	12 75 to 13 00
No. 2 Strong Foundry	12 60 to 12 85
No. 3 Foundry	12 25 to 12 50
No. 2 Southern	12 85 to 13 10
Gray Forge, Valley furnace	11 30 to 11 50
Gray Forge, Southern (Cleveland)	11 85 to 12 00
Lake Superior charcoal	14 25 to 14 50

Finished Material.—Reports of concessions on billets, plates, steel bars and angles are persistent and have some foundation, but companies offering these products at low prices are, as a rule, limited in capacity, and the principal producers seem to be adhering to agreed prices. Daily newspapers report more than thirty traction companies which are preparing to build lines this summer, but inquiry develops that few have been financed or are likely to be this year. Leading steam railroads are experimenting in the use of steel ties and their introduction promises to cause a most interesting and important expansion of the demand for steel at a not far distant date. The quotation of 1.35c Pittsburg or 1.44½c Cleveland for bar iron is still named by the principal producers, but the sale of 1,500 tons at Pittsburg last week at 1.25c, that city, shows what can be done when an order of good size is placed. Steel bars still quoted at 1.44½c, Cleveland, for Bessemer and 1.49½c for open hearth, but some of the smaller producers shade these prices. Cleveland jobbers are now selling galvanized as well as black sheets at net prices instead of by discounts from list prices. We quote as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.74½c; No. 11-12, 1.79½c; No. 14, 1.84½c; No. 16, 1.94½c; No. 27, 2.19½c; No. 28, 2.29½c. Galvanized, mill sales, No. 14, 2.29½c; No. 16, 2.39½c; No. 18-20, 2.54½c; No. 22-24, 2.69½c; No. 25-26, 2.89½c; No. 27, 3.09½c; No. 28, 3.29½c. Black sheets out of stock: ¼ in., 1.90c; 3-16 in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25. One pass cold rolled: Nos. 18-20, 2.35c; Nos. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Considerably lower prices than the above have been named in competition, as low as 2.10c having been done on car load lots of No. 28 black sheets.

Old Material.—The market is lifeless. Prices are to a large extent nominal. We quote as follows:

Old iron rails	$14 00 to 15 00
Old steel rails (over 6 feet)	12 00 to 13 00
Old steel rails (under 6 feet)	11 00 to 12 00
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	9 00 to 10 00
Malleable iron (agricultural)	8 00 to 9 00
Heavy steel	9 00 to 10 00

We quote the following net tons:

No. 1 R. R. wrought	$10 00 to 11 00
No. 1 busheling	8 50 to 9 00
No. 1 machine cast	9 50 to 10 50
Iron axles	15 00 to 16 00
Axle turnings	7 00 to 8 00
Wrought turnings (free from cast)	6 00 to 6 50
Grate bars	7 00 to 8 00
Pipes and flues	8 00 to 8 50
Tank iron	7 50 to 8 50
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	6 00 to 6 50
Stove plate	7 50 to 8 50
Steel axles	13 00 to 14 00
Cast borings	4 00 to 4 50

CINCINNATI.

June 28.

The coke market continues dull, particularly in foundry coke, and an easy tone prevails, with Connellsville quoted at $1.80 to $2 a ton f. o. b. ovens for the best brands. There is rela-

tively more activity reported in furnace cokes than in foundry grades, but at low prices.

Pig Iron.—The week has developed practically nothing new in the situation. The general run of buyers of foundry iron still defer placing orders. Now that $9 Birmingham is the acknowledged market, buyers are talking lower prices, and in some instances assert that they will not buy until iron can be purchased at 25c to 50c per ton under the present quotation. A few larger consumers have placed some orders during the week, but these were mainly for prompt shipments. A local foundry bought in the neighborhood of 1,600 tons by analysis. A large pipe manufacturer bought 5,000 tons of Southern iron, and it is claimed that at least a part of the order was placed at a shade under $9. Another large consumer took 2,000 tons, divided between No. 2 foundry and No. 3 foundry, on the $9 basis. A merchant pig iron interest is credited with the purchase of 2,500 tons in St. Louis territory. The leading pipe interest, which was expected to come into the market last week, has decided to defer buying for the present. The large inquiry from the leading interest in harvesting machines is still pending, and it is understood that this purchase will also be delayed. In the aggregate a small tonnage is reported for the week, and the general situation is dull. Advices from Birmingham are to the effect that the first of July will develop a strike condition, as the furnace interests declare their determination to demand a reduction of the minimum wage scale for mining coal, while the miners are apparently as firm in their stand not to accept the reduction. It is significant in this connection that sales at companies' stores are falling off, and that some of the furnace interests have bought furnace coke. It is the declared intention of some of the larger furnace companies to blow out in case of a strike. Sales agents regard this feature of the situation as an element of strength, in spite of the dullness in demand. It is difficult to establish a distinct tone to the market, and it is still best described as a waiting situation. We quote f. o. b. Cincinnati, as follows:

Southern Foundry No. 1	$12 25 to 12 50
Southern Foundry No. 2	11 75 to 12 00
Southern Foundry No. 3	11 25 to 11 50
Southern Foundry No. 4	11 00 to 11 25
Southern Foundry No. 1 soft	12 25 to 12 50
Southern Foundry No. 2 soft	11 75 to 12 00
Gray Forge	10 50 to 10 75
Northern Foundry No. 1	13 65 to 13 90
Northern Foundry No. 2	13 15 to 13 40
Southern car wheel iron	16 25 to 16 50

Finished Material.—The market shows no change and buying is still confined to conservative quantities covering present requirements. Bar iron is easy at 1.40c f. o. b. Steel bars, 1.48c base, half extras, with dealers quoting 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.16c; No. 10, 2.05c. Tank plates are dull and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe, independent mills continue to undersell the leading interests, and the market is accordingly irregular and easy. Business is quiet, however, and the movement moderate, even at concessions. We quote in carload lots, f. o. b. Cincinnati:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe Black. Percent.	Guaranteed Wrought Iron Pipe Galv. Percent.
⅛, ¼, ⅜ inch	67.7	57.7	64.7	54.7
½ inch	70.7	60.7	67.7	57.7
¾ to 6 inch, inclusive	74.7	64.7	71.7	61.7
7 to 12 inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—Dealers complain of a lack of interest on the part of buyers. Prices are largely nominal. Dealers are buying as low as possible and holding their purchases for a future demand.

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	12 50 to 13 00
Old steel rails, gross tons	9 50 to 10 00
Old short lengths, gross tons	10 00 to 10 50
Old iron axles, net tons	13 50 to 14 00
Stove plate, net tons	6 00 to 6 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	3 00 to 3 50

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., June 28.

Pig Iron.—The feature of the week was the issuance of the specifications for the castings that will be required to build the East river section of the Pennsylvania tunnel, the contract for which has been awarded to the S. Pearson & Son, Ltd., of London, with offices at No. 128 Broadway, this city, and which will call for 108,000 tons of pig iron, deliverable in from two to three years, on an average of about 4,000 tons monthly. Although several days have elapsed since the specifications were sent out, the responses received so far have been very disappointing to the contractors, for the number of bids have been small, and the prices quoted greatly in excess of what was expected.

The contractors thought that with the dullness in the pig iron market, everything would be in their favor, and that they would have their greatest difficulty in deciding whether they should contract for the castings outright, which they preferred to do, or purchase the iron and get foundries to convert it into castings, which they were willing to do. Furnaces and founders, however, while admitting that business conditions in their respective lines are not favorable, have acted as stated, believing that things are either not going to get worse or that they are going to get gradually better. As matters stand now it looks as if the same interests which took the Hudson River section tunnel castings will take this contract also, as no other concerns seem disposed to take it unless it is at considerably higher prices.

The local pig iron market during the week showed no change from the week previous. Only a moderate tonnage was placed, the bulk of which went to Northern furnaces, which made concessions in many instances. The Southern situation is unchanged, No. 2 foundry selling at $9 at Birmingham, with producers being less inclined to take orders at that figure, and giving considerable attention to export trade without any results worth mentioning. Many buyers are willing to contract for their requirements for the remainder of the year at present prices, but for the business outlook in the interim being so uncertain. The furnaces are loath to take contracts, however, beyond the third quarter. Pig iron warrants are offered at $9 for the remainder of the year. New York quotations at tidewater follow: Northern No. 1 X foundry, $14.75 to $15; No. 2 X, $14.25 to $14.50; No. 2 plain, $13.75 to $14; Southern No. 1 foundry, $13.25 to $13.50; No. 2 foundry, $12.50 to $13; No. 3 foundry, $12 to $12.50; No. 4 foundry, $11.50 to $12.

Finished Iron and Steel.—Business in every branch of the finished material market was exceptionally quiet during the past week. In structural material and plates there was a disposition shown to await the outcome of the meetings of the respective pools on these next month. This was especially true when a contract of any magnitude appeared, although opinion is strong that no change will be made in price schedules. The small contracts booked in structural shapes and plates were not very numerous. In bars the demand has been about the same as it has been for weeks. In sheets jobbers report new business to be very light. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84¼c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron and soft steel bars, 1.49½c; sheets, in carload lots, New York, No. 28 black, 2.35c to 2.40c; galvanized, 3.40c to 3.45c.

Old Material.—There has been no change in the situation during the week. Offerings have been very heavy, with dealers unwilling to accept them unless on bargain terms. Heavy steel scrap continues in good demand, but stocks are scarce. Export trade has been less inviting than for weeks past. The feeling that an improvement in trade will set in by the early fall has become strong, and many dealers are

increasing their stocks in anticipation of it. Holders could perhaps realize the following prices per gross ton:

Old iron rails	$14 50 to 15 00
Old steel rails, long lengths	11 75 to 12 50
Old steel rails, short pieces	10 00 to 10 50
Relaying rails	17 00 to 18 00
Old car wheels	11 00 to 11 50
Old iron car axles	15 50 to 16 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	10 00 to 10 50
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 50 to 11 00
Wrought pipe	8 00 to 8 50
Ordinary light iron	6 50 to 7 00
Cast borings	3 50 to 4 00
Wrought turnings	5 50 to 6 00
No. 1 machinery cast	9 50 to 10 50
Stove plate	8 00 to 8 50

BIRMINGHAM, ALA.

Birmingham, Ala., June 27.—While the pig iron market in the Southern territory is quiet and inclined to be dull, there is a better feeling as to an early improvement, provided local conditions, particularly a suspension of work on the part of union coal miners, do not interfere to any great extent. Inquiry at the offices of some of the larger iron corporations show a better inquiry than has prevailed for some little time. The Sloss-Sheffield Steel & Iron Co. reports that its sales for June will reach 42,000 tons, exceeding the production by several thousand tons. The Tennessee Coal, Iron & Railroad Co. has twelve furnaces in operation and is shipping about their make. No. 2 foundry iron is selling at about $9.25 per ton. The two companies whose names were connected with $9 iron do not acknowledge sales at the price. The Central Foundry Co. (pipe) was reported in the market for a round sum during the past week, but furnace companies called on refused to sell at $9.

Announcement is made that there will be no increase in Chicago rates on Birmingham iron July 1. It had been officially stated that Chicago rates would take on an advance; it is now said that conditions warrant no change in the rates.

The production in Alabama is still quite heavy. There are no intentions of curtailing production any in this section so far as the market is concerned. Preparations have been made for emergency in case of a suspension on the part of the miners, considerable coal and coke being laid up for such a condition.

The following quotations for pig iron are given: No. 1 foundry, $9.50 to $9.75; No. 2 foundry, $9 to $9.25; No. 3 foundry, $8.75 to $9; No. 4 foundry, $8.50 to $8.75; gray forge, $8 to $8.25; No. 1 soft, $9.50 to $9.75; No. 2 soft, $9 to $9.25.

The present contract with the United Mine Workers of America expires on June 30. There have been negotiations on in this district between the two interests for the past ten days. The miners have offered to renew the present contract, which has a wage based on the selling price of iron ranging from 47½ cents to 57½ cents per ton. The furnace operators offered a scale also based on the selling price of iron, ranging from 40 cents to 55 cents per ton. The two interests named a scale committee and joint sessions behind closed doors are being held. The miners will reconvene on Wednesday, June 29, to receive a report from their scale committee. The indications are there will be a suspension of work in this district. So far the commercial coal operators, those who produce coal not used in the manufacture of pig iron, have had very little to do with the negotiations.

It is given out that should there be no suspension of work in the coal mining district the Birmingham rolling mills (Republic Iron & Steel Co.), and the Bessemer rolling mills (Tennessee Coal, Iron & Railroad Co.), will be started up about July 5. The Sheffield rolling mills are also making preparations to that end. The statement is made that these mills will resume operations under the old Amalgamated Association scale pending the making of a new one. The Gate City rolling mills (Republic), have been in operation for some time and have been shipping their product steadily.

There is still much activity in steel production and shipment in the Birmingham district. The new plant of the Alabama Steel & Wire Co. at Gadsden, Ala., made its first steel in the week and already some of it has been rolled in the rod mills at Ensley. The Alabama Steel & Wire Co. purchased a lot of steel in Pennsylvania and have been working on that at the Ensley plant. The new steel made at Gadsden has so far given satisfaction and it is intended to increase the output at Gadsden just as quickly as the machinery can be gotten in good running condition. There is a healthy demand for the products of the Ensley wire and nail mills. The steel plant of the Tennessee Coal, Iron & Railroad Co. is working steadily.

The cast iron pipe makers in the Birmingham district have about as much work on hand and in contemplation as they will be able to take care of for some time. The United States Cast Iron Pipe & Foundry Co. at Bessemer is making shipments daily to St. Louis. The Dimmick Pipe Co. at North Birmingham has been shipping steadily, the product going as far west as California. The cast iron pipe makers are reaping a harvest.

PHILADELPHIA.

June 28.

Pig Iron.—There is very little demand and prices are weak. Orders of good size would undoubtedly result in concessions being made, but in the small buying now being done, prices show little change. We quote as follows for Philadelphia and near-by points: No. 1 X foundry, $15 to $15.25; No. 2 X foundry, $14.50 to $14.75; No. 2 plain, $14 to $14.25; Alabama No. 2, rail shipment, $13.75 to $14; Alabama No. 2, on dock, $13 to $13.25; standard gray forge, $13.50 to $13.75; ordinary gray forge, $12.75 to $13; basic, $13.75 to $14.

Finished Material.—Business is as dull as in pig iron. There is some discussion of possible readjustment of pool prices, but changes are really not expected. Outside mills are cutting prices, but not getting many orders. Quotations remain as follows: Beams, channels and angles, 1.73½c to 1.85c, according to the specifications, and small angles, 1.50c to 1.55c. Bars, both iron and steel, 1.48½c to 1.55c; skelp, 1.45c to 1.50c seller's mill for grooved and a tenth more for sheared.

Old Material.—Prices are stationary and there is almost no buying except occasionally by a speculative dealer. We quote: No. 1 steel scrap, $11 to $11.50; low phosphorus scrap, $15 to $16; old steel axles, $15 to $16; old iron axles, $16.50 to $17; old iron rails, $14.50 to $15; old car wheels, $11 to $11.50; choice R. R. No. 1 wrought, $12.75 to $13; machinery cast, $11.50 to $12.50; No. 2 light scrap (forge), $10 to $10.50; No. 2 light scrap (ordinary), $8.50 to $9; axle turnings, $9 to $9.50; wrought turnings, $8 to $8.50; cast borings, $6 to $6.50; stove plate, $8.75 to $9.25; wrought iron pipe, $9.50 to $10.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, NO. 150 NASSAU ST., June 28.

Pig Tin.—Speculative interests in London bid up the metal during the week, and as a result prices are a little higher than when we last quoted them. Trade conditions, however, remain about the same as they have for weeks, the demand from consumers being light. The London market has been very active, and prices advanced appreciably. Closing prices here today follows: Spot, June and July, 25¾c to 26c. London's closings today follow: Spot, £117 15s; future, £117 5s. Arrivals at Atlantic ports for the month to date aggregate 3,150 tons, with 1,719 tons afloat.

Copper.—While prices show no change from those last quoted, the feeling in the market has become more hopeful, due to buying for domestic and export purposes being of a better and larger character. All of the large producers report consumers as being more willing to purchase than for weeks past. The London market remains firm and trading has been quite active. Today's closings follow: Lake, 12⅝c to 12¾c; electrolytic, 12½c to 12⅝c; casting, 12⅛c to 12¼c. London's closings follow: Spot, £56 16s 3d; futures, £56 15s. Exports for the month to date aggregate 10,801 tons.

Lead.—An increased demand is noticeable, and prices

have advanced to 4.25c to 4.35c for spot. St. Louis is stronger at 4.12½c. London is slightly weaker at £11 8s 9d.

Spelter.—Is steady and in good demand at 4.80 to 4.90c. St. Louis is higher at 4.70c, and London advanced to £22.

Antimony.—Both Cookson's and Hallett's are selling at 7¼c, and other brands at 6¼c.

Quicksilver.—We quote $45 per flask of 76½ pounds in lots of 100 flasks. London is £8.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, June 28.

Further weakness has developed in the metal market and prices continue their downward course. Demand is very light and a purchaser with a good-sized order could undoubtedly shade the following quotations: Lake copper, 12¾c for carloads and 13¼c for less than carload lots; casting, 12½c for carloads, and 13c for smaller quantities. Pig tin is selling at 27c to 27½c, according to quantity. Spelter, 4.80c to 4.90c in carload lots, and 5c to 5¼c in lesser lots. Sheet zinc, 5.90c for carlots of 600-lb. casks, and 6.15c to 6.20c for less than carload lots. Pig lead is unchanged at 4.20c for 50-ton lots, 4.25c for car lots, and 4.35c for less than car lots.

Old metals are in quiet demand in sympathy with the new product. Prices are sagging. We quote: Copper wire and heavy, 10¾c; copper bottoms, 9¾c; copper clips, 10½c; red brass, 9⅝c; red brass borings, 7¾c; yellow brass, heavy, 7½c; yellow brass borings, 6c; light brass, 5⅜c; tea lead, 3½c; zinc, 3.75c.

Personal.

J. P. Levan has retired as president and general manager of the Altoona Foundry & Machine Co., Altoona, Pa. S. M. Griffith succeeds him.

Percy Parrock, formerly of Youngstown, O., has been appointed superintendent of the Hamilton Rolling Mill Co., Hamilton, Ont.

S. A. Wallace, superintendent of the Alliance, O., plant of the American Steel Foundries, has resigned to take the management of the steel foundry and chilled roll departments of the United Engineering & Foundry Co., Pittsburg.

Bert Sexton, night superintendent of the Brown-Bonnell plant of the Republic Iron & Steel Co., Youngstown, O., while sitting in his office was mysteriously shot last week and seriously wounded.

A. M. Mattice, chief engineer of the Allis-Chalmers Co., has returned from his European tour of inspection. While in Europe he visited the hydraulic machinery works of Escher Wyss & Co., of Zurich, and arranged details concerning the manufacture in the United States of their products. He also inspected the Nurnberg Gas Engine Works, at Nurnberg, and at the engineering establishment of Willans & Robinson, Rugby, Eng., paid particular attention to the methods of manufacture of the Steam Turbine Advisory Syndicate, of which organization the Allis-Chalmers Co. is the American member. Mr. Mattice had several important consultations in London with Mr. Yarrow, the torpedo boat builder, on turbines for marine purposes, and while on the Continent he made a series of tests of the Zoelly steam turbine.

Charles T. Allen, who has been identified with the Union Steam Pump Co., of Battle Creek, Mich., from its beginnings, has been elected president of the City Bank of Battle Creek.

Machinery Wanted for East River Tunnel.

NEW YORK, June 28.—S. Pearson & Son, Ltd., of London, who have the contract for building the East river section of the Pennsylvania tunnel, have issued the specifications for the machinery that will be required. The machinery, it is thought, will cost about $1.000.000, and consists of air compressors, engines, generators, pumps, etc. Purchases will be made immediately. All inquiries should be addressed to the company's office at No. 128 Broadway, this city.

The rolling mill of the Kittanning Iron & Steel Co., Kittanning, Pa., has been shut down. The blast furnace at this plant will shut down about the first of the month.

OBITUARY.

Ernest E. Mann died at his home in Detroit, June 17, from a stroke of apoplexy received five years ago. He was born in Ann Arbor and had been a resident of Detroit 30 years. He was for a number of years superintendent of the Michigan Radiator & Iron Mfg. Co., and when that company was taken over by the American Radiator Co. Mr. Mann was made assistant manager, which position he held until he was obliged to resign on account of illness.

John Joseph Barnier died at his home in Brooklyn, N. Y., June 16, in his 81st year. He was born in Dublin, Ireland, and came to this country as a boy and entered the employ of J. Cocker & Co., large importers of manufactured iron. He became a member of the firm, amassed a large fortune and retired from business early in life.

Andrew J. Phillips, head of the A. J. Phillips Co., Fenton, Mich., died June 14 at his home in that city. He was born in 1837 and lived at Fenton since 1869. For many years he manufactured pumps and in later years snow shovels and extension window screens.

William Maischoss, who had for many years been a member of the firm of Maischoss Bros., file manufacturers of Buffalo, died June 20, aged 56 years.

Ex-Congressman Carlos D. Shelden died at his home in Houghton, Mich., June 24. Mr. Shelden was born in Walworth, Wis., June 10, 1840. After serving four years as a Union soldier in the Civil War, he returned to Houghton. In 1872 he became manager of the Portage Lake Foundry, which position he held for eighteen years. He then became superintendent of the Shelden & Shafer Iron Co., Crystal Falls, Mich. He served two terms as a member of the Michigan Legislature and was a member of Congress from 1896 to 1902.

James Paton, general manager of the National Safe & Lock Co., Cleveland, died at his home June 27. His death followed a short illness with pneumonia. Mr. Paton was born in Glasgow, Scotland, in 1832. He came to Cleveland in the early fifties, settling in Newburg. He began his career as a humble workman, but soon demonstrated his ability and was promoted to positions of much responsibility. He was superintendent for a number of years of the plate department of the Cleveland Rolling Mill Co., and also was superintendent, for a time, of the Union Iron Works. While holding the latter position, in 1872 the Emma blast furnace was built under his supervision. In 1894 he was one of the organizers of the Crescent Tin Plate Co. and was its superintendent until succeeded by his son. He had been general manager of the National Safe & Lock Co. for several years. Throughout his long career in the iron and steel business Mr. Paton was very successful, especially as a manager of men and in perfecting machinery. His son, J. D. Paton, is superintendent of the Empire Rolling Mill Co.

The annual convention of the National Association of Stationery Engineers was held in Cincinnati last week. Isidor Rauh, general manager of the Cincinnati Electric Tool Co., who was secretary of the general committee of arrangements for the convention, was honored by the presentation to him of a silver loving cup at the banquet tendered by the Cincinnati Engineers' Association to the delegates as a closing function of the convention.

The property of the Stilwell-Bierce & Smith-Vaile Co., Dayton, O., is to be offered for sale on the following terms: The old plant, machinery and appliances covered by the $300,000 mortgage bonds to be first offered in bulk; all of the rest of the property to be next offered in bulk, and then the property as an entirety with the good will to be next offered. There will be required a deposit of $10,000 upon bids for the partial offerings and $25,000 upon the entirety.

The Bostwick Steel Lath Co., Warren, O., held its annual meeting a few days ago and decided to increase its capital stock from $100,000 to $200,000. The company has had a very successful year and a dividend of 10 percent was declared. The old officers, as follows, were re-elected: President and treasurer, William G. Hurlburt; vice president, John H. Park; secretary, D. J. Jobe.

NEW FEATURES OF THE WEIMER CINDER CAR.

The disposal of the cinder from a modern blast furnace with an output of from 350 to 600 tons of pig iron a day is no small factor in the cost of producing iron, and any improved method of handling the cinder receives ready consideration. Some furnaces are more favorably situated than others

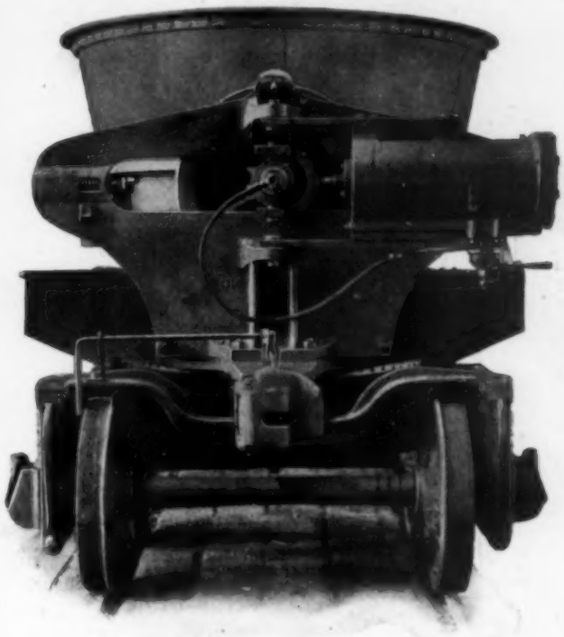


FIG. 1.—WEIMER CINDER CAR WITH SWINGING CYLINDER IN POSITION FOR DUMPING TO LEFT.

and may depend on the railroad companies to remove their cinder, the only cost being that for loading on cars. Others again have to haul the cinder for several miles to a dumping ground, filling up marshy places and making the land suitable for building purposes. But the furnace that is built in a restricted locality and whose dumping ground is limited has a problem in which the appliances for cinder handling become an important element. The car shown in the two illustrations has a capacity of 200 cubic feet. It is built to withstand the rough handling cars of this description generally receive in the hands of cinder bank labor, wrought iron and cast steel being used throughout, with the exception of the inner shell of the ladle. The wheels and axles are standard 33-inch pattern. The operating mechanism using one cylinder for dumping on either side, in combination with a car whose ladle travels to the side while being emptied, is the subject matter of several patents granted to Edgar A. Weimer, of Lebanon, Pa.

A feature to be noted, and one added since these cars were first made, is the oil retarding cylinder, shown at the rear end, Fig. 1. The addition of this cylinder prevents the ladle being dumped too quickly, as the by-pass can be set for any speed desired and the operation reduced to such a degree that no skill is needed to dump the ladle.

The car as shown in Fig. 2 is arranged to dump on either side. The manner of handling this car is first to place the cylinder to the side opposite to that on which the cinder is to be discharged. This is the work of a minute, requiring the taking out of one thumb screw, swinging the cylinder around on its bearings and replacing the thumb screw. The steam or air connection is by a flexible copper hose, and swings with the cylinder. The connection to the locomotive is by a hose such as is used on air brakes generally.

To tilt the ladle the operator must first relieve the safety pin engaging the rim of the large gear wheel at the very top, shown by the small handle above the center of the gear. He next takes hold of the throttle lever on the under side of cylinder at the rear end, admitting steam or air sufficient to move the gear forward. The valve may be jerked wide open without any harm, as the oil cylinder provides for this misuse. The throttle is of such a design that the ladle is brought to a gradual stop at the end of its travel.

To bring the ladle back to its vertical position the operator pushes the throttle lever in the opposite direction, which admits steam to the other end of the cylinder and reverses the motion; the ladle returns and the latch pin is dropped in, the car then being ready for another charge of cinder.

These cars are sometimes lined with shaped fire-brick and clay washed before using. Some slags attack the brick lining more than others and in such cases a cast iron lining will give better results. Whenever it can be done the car should be run to the dumping ground as soon after it is filled as possible. One of the advantages claimed for the use of a car of this kind over any method of handling cinder in the chilled, granulated or broken form, is that the cinder bank will be one solid mass and will not grow as fast as where the other methods are used. The ease with which this car can be operated permits the employment of a boy, or the fireman on the locomotive can be given charge of the dumping.

The car is equipped with automatic couplers. The trucks are of cast steel, cast in one piece and connected by an improved cast steel coupling frame. When several cars are used in a train, the steam or air is carried around the bale from one car to the other. All the parts are made to templates and are interchangeable.

The two illustrations show this car in different positions and are from photographs of a car now exhibited in operation in the Mines and Metallurgy building at the World's Fair St. Louis.

Buffalo & Susquehanna Iron Co.'s Plant.

Construction work on the plant of the Buffalo & Susquehanna Iron Co. is nearing completion, and will, it is expected, be finished in about thirty days. The company has one of the finest ore yards and bin systems in the country. The yard is 800 feet long and 250 feet wide, with bed of solid concrete. It is located between the furnaces and the company's ship canal, so that boats can unload into it direct. The ship canal is about one mile in length, 200 feet wide and 23 feet deep. It cannot be entirely completed before next spring, as it is necessary to excavate through solid rock 10 feet in depth for nearly the entire length of the canal.

At a meeting of the stockholders of the Burden Iron Co., Troy, N. Y., the following trustees were elected: James A.

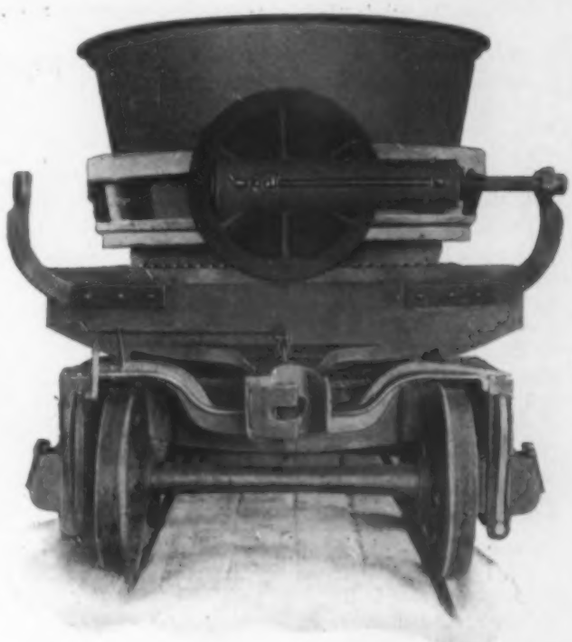


FIG. 2.—VIEW OF WEIMER CINDER CAR SHOWING OIL CYLINDER WITH BY-PASS.

Burden, I. Townsend Burden, John L. Arts, James A. Burden Jr., Williams P. Burden and Arthur S. Burden. The trustees elected these officers: President, James A. Burden; vice president, James A. Burden Jr.; general manager, John L. Arts; secretary, Nicholas J. Gable.

14-INCH CUTTER AND REAMER GRINDER.

A machine capable of grinding heavy cutters of large diameter and long face, as used on larger-column and planer-type milling machines, as well as grinding the large diameter inserted tooth cutters, is produced by the Becker-Brainard Milling Machine Co., of Hyde Park, Mass. A feature of the machine is that it requires no extra fixtures for handling any style of milling cutter or reamer. There are two separate knees each with its own slides and the cutter to be ground is transferred from one to the other for the different operations on the side and end teeth. One of the two columns has a knee with saddle and table with 6 inches of vertical adjustment and swiveling around the column in either direction. This column is graduated so that a setting can be instantly made, to give the proper angle of clearance of the cutter for different diameters of emery wheels used. The table on the saddle is fed by a rack and pinion, having a longitudinal feed of 20 inches and a cross feed of 7 inches, and is provided with a graduated swivel head which carries a bar on which to slide cutters while being ground. Head and tail centers are also provided for holding end mills and reamers which have to be ground on centers.

FIG. 1.—14-INCH CUTTER AND REAMER GRINDER.

The second column is provided with a swivel carriage carrying two cross slides, the top slide having 7-inch and the lower slide 9-inch adjustment at right angles. On the top slide is mounted a graduated swivel head or holder, which slides on a bar, having a travel of 5 inches, used for grinding the end teeth of cutters and end mills.

Fig. 1 gives a view of the machine as regularly made. On the left-hand side is the main knee mentioned above, which swivels around the supporting column, and carries the head and tail stock for grinding cutters on centers, or with bar inserted in place of the head stock center and the tail stock removed. Cutters are ground by sliding them on the bar in front of the wheel, which insures a cutter ground straight and true with the hole. On the right hand side is a new arrangement for grinding the endmills or the side teeth of straddle mills and inserted tooth cutters. This sliding head can be swiveled for grinding bevel or dovetail mills and is provided with a plunger finger which is always set on the center. The object of this arrangement is to do away with many of the devices ordinarily used for this work; it is also unnecessary to use any other than the 7-inch emery wheel shown.

Fig. 2 shows the front view of the sliding head set for a bevel cutter In Fig. 3 is a large inserted tooth face mill in the sliding head that is a most difficult cutter to handle on any grinder without using special fixtures. The sliding head arrangement on this machine makes the operation a simple one. Fig. 4 shows a large slab milling cutter on the bar in position for grinding.

The centers swing 14 inches and will take between them 14 inches. The longitudinal feed of the table is 20 inches; the cross feed, 8 inches; elevation of the knee on the column, 6 inches; side knee elevation, 10 inches. The lower cross slide is 9 inches, the top cross slide 7 inches and the cutter head slide on the bar is 5 inches. The weight of the machine is 1,570 pounds.

Dominion Iron & Steel Co.

A director of the Dominion Iron & Steel Co. has been quoted as saying: "The plant of the Dominion Iron & Steel Co. has been shut down indefinitely. We wanted to take this action three months ago when we reduced wages 33⅓ percent, but at that time the men refused to strike and we could not very well shut down the plant with the government paying us a substantial bounty and Nova Scotia and Sydney governments paying us subsidies, but now that the men have voluntarily struck we have closed down the works and they will not be reopened before Jan. 1, when we expect to have our rail mill completed and the Dominion Iron & Steel Co. a finished proposition. The Dominion Iron & Steel Co. has not been making any money, although it has not been losing any, quitting about even. It has been demonstrated that we cannot make any money in selling raw material, like billets. The money is in finished steel products, and with our rail mill completed we will be in shape to start upon a money-making career, and I see nothing to prevent us, owing to the government bounty and our many natural advantages."

Dravo, Doyle & Co., of Pittsburg, have recently received the contract for two 26 and 42 x 27-in. cross compound shaft governor Corliss engines, built by the Ball Engine Co., of Erie, Pa., for the People's Ice, Light & Storage Co., McKeesport, Pa. These engines are for direct connection to 425-k. w. alternators and have a maximum rating of 1,000 h. p. In the first six months this year Dravo, Doyle & Co. have taken orders for Cochrane feed water heaters in the Pittsburg and Cleveland territories amounting to 72,900 h. p. The record is worthy of note in view of the dullness in many lines during that period.

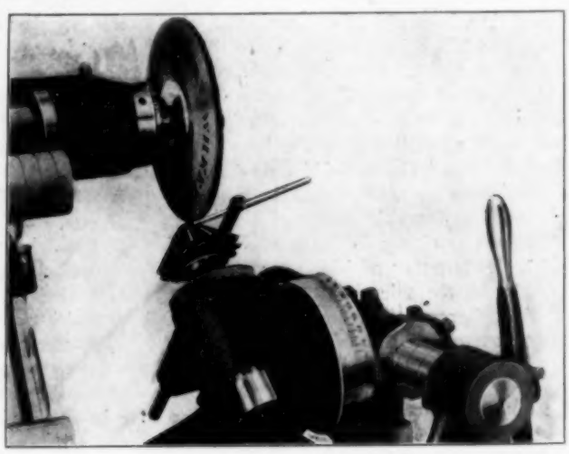


FIG. 2.—FRONT VIEW OF SLIDING HEAD SET FOR GRINDING BEVEL CUTTER.

BRITISH VS. AMERICAN BLAST FURNACE PLANS.

In a recent issue the London *Iron and Coal Trades Review* referred to the fact that work on two of the principal blast furnace plants in Great Britain, designed by a well-known American engineer and carried some distance toward completion had been discontinued, with no present intention of carrying it further. One is in the North of England and the other in Wales. The reasons were not given, but the general statement was made that less advantage had been taken of Amer-

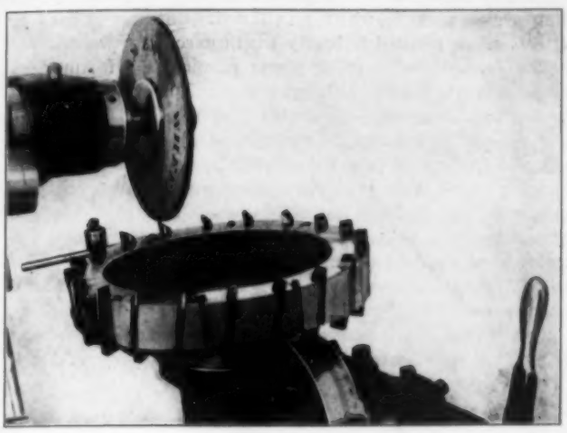


FIG. 3.—SLIDING HEAD GRINDING LARGE INSERTED TOOTH FACE MILL.

ican plans and methods than was expected. In its last issue the same paper makes more extended reference to the same subject. After saying that incompetency was not the fundamental reason for the discontinuance of operations under the plans of the American engineer in question, the article goes on:

"The American engineer knows his business, and he generally knows it well. But he is not the only one that knows his business, and it must have 'galled the kibe' of British engineers again and again, not so much to see American engineers preferred over their heads, as to have it suggested in common conversation, and in newspaper comments, that the latter alone were preachers of the true gospel. A correspondent, commenting on our recent paragraph, above alluded to, makes the following pertinent remarks:

"'Your paragraph is substantially correct, and it indicates a severe blow to American blast furnace engineering in this country. There is more to follow, but of that we shall see and hear later. There are blast furnace engineers in this country who know far better what is wanted for British pig iron production than any American. But if they ask the iron masters to spend one quarter of what they are now spending under American engineering direction they would be considered fit for a lunatic establishment. The American engineer aims at making big makes per furnace. The British engineer knows the sort of men and materials there are to work with, and aims at making money rather than big makes per furnace.'

"Reading between the lines, it seems to us to be clear that our correspondent has a grievance, and we are entitled to speak of it as a legitimate one. Have British iron masters given their engineers anything like the free hand that has been given by American iron masters to engineers who had similar work to carry out in the United States? If not, then any parallel or comparison must fail in relevancy. The American engineer has often an absolutely free hand in the matter of expenditure. The British engineer is more often than not seriously hampered in respect of capital, and has to cut the cloth according to a very lean measure. Mr. Carnegie is stated to have gone over one of his newly-built mills, and watched its operation with interest and approval. His engineer, however, told him that in the course of the experience gained in the design and construction of the new mill he had seen some defects or drawbacks that he could improve upon if he had to design and build another. Ascertaining that these differences would be likely to make a sensible increase of yield, with little or no higher cost, Mr. Carnegie is said to have authorized the engineer to carry his new ideas and experience into immediate practical effect by building another mill. The British engineer, with a free hand, who admitted that he had not done all that was humanly possible to begin with, would have stood a considerable chance of being cashiered on the spot, and probably knowing that, he would hardly dare to speak of the possibility of further improvement. One or two recent cases of this description are pretty generally known. Any one who attempts to introduce novelties, which are usually the basis of improvements, runs the risk of failure, or, at least, of finding that his anticipations have not been realized. The Americans are generally prepared to take this chance. The British seldom are. This and kindred influences go far to explain the differences in results. It is only fair to the British engineer and manager that this fact should be kept in mind, and the further fact that he rarely is allowed the same chance as his American colleague. In most well-ordered establishments in the United States, the manager and engineer has not only a freer hand, but he is not subject to the same interference from a board of directors, most of whom know nothing, or next to nothing, about the business, and measure success largely by the cheapness of the job. Such men more often than not do not know a good man when they have one. Of men who suggest improvements or novelties of any sort, they have a holy horror, believing them to be extravagant and dangerous. If a manager fails to earn dividends, no matter from what cause, he is under a cloud. The manager knows all the time that he could do much bigger things if he could get rope enough, but as this is denied him, he has to jog on in the old groove, thankful if he can scrape together a bare 4 percent or 5 percent on an average of years. Truly there is a British side to this hitherto one-sided controversy, and it is high time that it was heard. We hope that some of our readers will assist in its presentation."

For the purpose of collecting and disseminating information pertaining to the trade, representatives of many of the pump manufacturers in this country have formed the Iron Pump Manufacturers' Association. The officers are: President, F. E. Myers, of Ashland, O.; vice president, H. I. Park, of Kendallville, Ind.; treasurer, E. H. Sleight, of Moline, Ill.; secretary, T. R. Barnes, of Mansfield, O.; and commissioner, W. M. Webster, of Chicago. It is the intention of the organization to appoint a committee to hear and settle all disputes which may arise among its members.

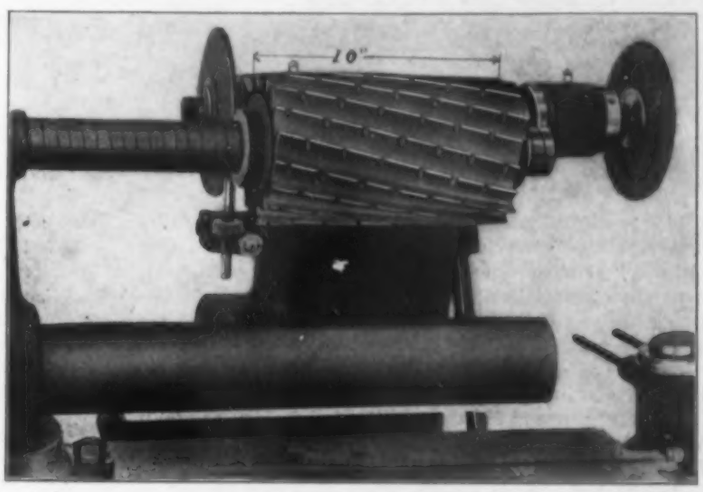


FIG. 4.—LARGE SLAB MILLER ON BAR IN POSITION FOR GRINDING.

The Standard Specialty and Tube Co. has been organized at New Brighton, Pa., to engage in the manufacture of collapsible tubes and metal specialties. This company is an identified interest of the Pierce-Crouch Engine Co. of the same place, engaged in the manufacture of gas engines.

AN IMPROVED LATHE HEADSTOCK.

A lathe head which has been developed to meet the demands resulting from the use of high speed steels, is a late improvement of the Lodge & Shipley Machine Tool Co., of Cincinnati. The main feature of the arrangement shown is that the pulley and sleeve are so constructed that the spindle gets no belt strain, this being taken by two bearings that support the pulley sleeve independent of the spindle bearings. This makes possible very heavy drives without any impairment of the life or accuracy of the machine. The sleeve has a hole through its center, which is one-eighth in. larger in diameter than the lathe spindle, so that there is no point of contact between the sleeve and spindle. Thus high speeds are secured through the back gears without running the pulley on the spindle, and there is thus no pull of the belt on the latter and nearly all friction is done away with. This will add much to the life of the spindle bearings and enable the spindle to maintain perfect alignment much longer than under the old construction.

In Fig. 1 is shown the lathe complete with the improved headstock. Fig. 2 shows the spindle removed. The pulley on the sleeve is of large diameter and takes a much wider belt than formerly used on the standard cone pulley engine lathe. The four separate bearings in the headstock will be noticed, the two outer bearings carrying the main spindle, making it unusually long and steady. The end of the pulley sleeve has a positive clutch so that it can be engaged with one which slides on the inside hub of the face gear. This in turn is operated by a lever handy to the operator for engaging the spindle or the back gears. On the spindle are keyed two gears of different diameters into which either of a pair of sliding gears on the back gear shaft can be engaged. The back gear ratios are 3 to 1 and 9 to 1.

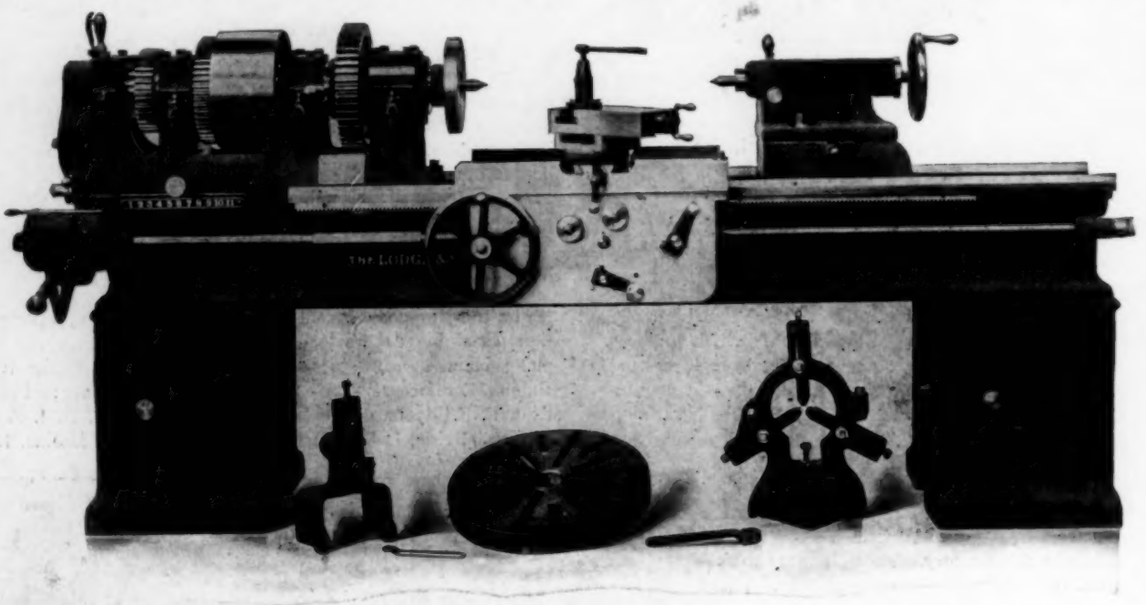


FIG. 1.—20-INCH LATHE WITH IMPROVED HEADSTOCK.

The back gear and shaft are made in one piece, the shaft running in self-oiling bearings at the ends. The bearings in this case are eccentric, instead of the usual arrangement of a sleeve running upon an eccentric shaft.

The oiling device is such that one oiling suffices for three months. The construction is such that it is impossible for any oil to get out of these bearings. Deep oil wells are cast in the center of the bearings for the spindle and sleeve and hold one pint of oil each. On the front of the head on each of these bearings is a lug which is bored out and a glass tube inserted in such a manner as always to show the level of the oil. Mounted on the spindle and sleeve and made to turn with them are brass rings with projections, on the principle of the "bucket pump," that have holes bored in the projections so that when the spindles are turning, these dip the oil out of the wells, and as they pass over the center of the spindle, they drop the oil on to the spindle and continue to do this regardless of the speed at which the spindle revolves.

Iron Trade Slackness in England.

Much space is devoted by the London press to the continued depression of Great Britain's iron and steel industry. The last weekly money market review of the *Daily Telegraph* says:

"Within the last few weeks there has been a marked change for the worse in steel and iron, slackening demand, failing hopes and moderate but persistent scaling down of prices being symptoms everywhere manifested. Business is hard to get and when secured is barely worth executing, were it not for the necessity of keeping plants running." Of American competition the *Daily Telegraph* says: "Previously within the last twelve months, exports of American iron in quantity were averted by concerted restriction of production. But the policy of the earlier months seems to have failed to find acceptation now. With production about maintained, stocks are being piled up. There seems nothing for it but a double edged competition, against which European combinations of a defensive nature would make but inefficient resistance."

The *Standard* writes in the same strain of the English and Scotch iron and steel markets. Then turning to other markets, it says: "Continental iron and steel markets are slacker, and certainly no satisfaction can be gleaned from public and private advices from America. Leaders generally consider that the full effect of the almost universal slackening of demand has not yet been experienced."

What British manufacturers most fear is that if the business contraction in the United States continues Europe will be made a dumping ground for the surplus American product of iron and steel. Already considerable arrivals of half manufactured steel from America are reported.

The Damascus Steel Co., with headquarters in Des Moines, Ia., incorporated under the laws of New Jersey and operating a plant at New Brighton, Pa., is preparing to close out its business. In a letter to the stockholders the officers of the company announce that a meeting will be held at East Orange, N. J., July 11, at which the affairs of the company will be wound up and the property sold or leased to some other concern. That say that, while it is true that under the so-called Dawson process they have been able to make some steel of high grade, the product has not been uniform.

Creditors of the Washington Foundry Co., Spokane, Wash., have petitioned for the appointment of a receiver, and the company has admitted its bankruptcy. The total liabilities are said to be $13,000.

AMERICAN STEEL FOUNDRIES' STOCK RELISTED.

The governing committee of the New York Stock Exchange has authorized the relisting of the $15,500,000 6 percent cumulative preferred stock and the $15,500,000 common stock of the American Steel Foundries. These securities were stricken from the list on Jan. 27, the reason assigned being that it had been found by the committee on stock list that there was an overstatement of $500,000 in the current assets of the company, as shown in the statement submitted to the Stock Exchange preliminary to the original listing of the stocks, in November, 1902. The management of the Steel Foundries has recently presented to the Stock Exchange a thorough statement of the company's affairs, showing the condition of the corporation on April 30, 1904, and has shown that the alleged error of $500,000, which resulted in the elimination of the stock from the exchange, was due to a misunderstanding between the officers of the company and the expert accountants who made up the statement.

In the statement of the company's condition, submitted to the Stock Exchange with the request for re-enlistment, the gross earnings of the company from July 31, 1903, to April 30 last are set forth as $604,458. The balance carried to surplus account in that period was $279,881, leaving a surplus available for dividends amounting to $1,689,729. The net earnings for nine months, ending April 30, 1904, were only $414,945 as against earnings of $1,760,938 for the full fiscal year ended July 31, 1903. The financial statement also contains an item of $123,554, which is deducted from the balance on hand on July 31, 1903, and explained as "adjustments at Jan. 31, 1904, by Audit Co. of New York affecting period prior to July 31, 1903." The stock of the company consists of $15,500,000 6 percent preferred and the same amount of common. "Net additions to plants since Aug. 1, 1902," is one item on the list of assets which amounts to $454,012. There are $471,000 worth of bonds of the American Steel Foundries outstanding, due Nov. 1, 1912.

Boiler Works May Build Near State's Prison.

Borger Bros., Columbus, O., may now proceed to erect their proposed boiler plant near the Ohio penitentiary in that city. The supreme court of the state has upheld the circuit court, which said that the law forbidding the erection of such plants near the penitentiary is unconstitutional. Borger Bros. owned a site near the entrance to the penitentiary. They started to erect a plant, whereupon the legislature passed a law to prevent the new construction, the contention being that the noise from the proposed boiler works would be a nuisance. Borger Bros. continued working on the plant. Arrests followed and fines were assessed in police court. The case was appealed and the common pleas court sustained the law, but the circuit court declared it unconstitutional. Work on the building has been suspended pending litigation.

Mr. Schwab on the Iron Situation.

Chas. M. Schwab returned last week from a short trip to Europe. When asked concerning the future of the steel and iron industry, he said: "My views on the future of the steel and iron industry of this country are well known. From what I hear, things are decidedly more favorable than they were some months ago. The progress of the steel and iron industry cannot be stopped. Of that I am firmly convinced. I do not look for any boom in the steel and iron trade this summer. We don't want booms. I do believe, however, that there will be a steady improvement. Of course, we are passing through the usual midsummer dullness, but the prospects for next year are decidedly bright. Conditions will get better all the time now, and after the election everything is bound to be all right.

"Regarding the report that I am slated for the presidency of the United States Shipbuilding Co., that is a matter I know little about and to which I have given little consideration. The question of the presidency of the company is in the hands of the directors, and they will select the person they consider best fitted to manage the affairs of the company." Mr. Schwab intimated that, in view of his large interest in the Shipbuilding company, it was safe to say he would take an active part in building it up.

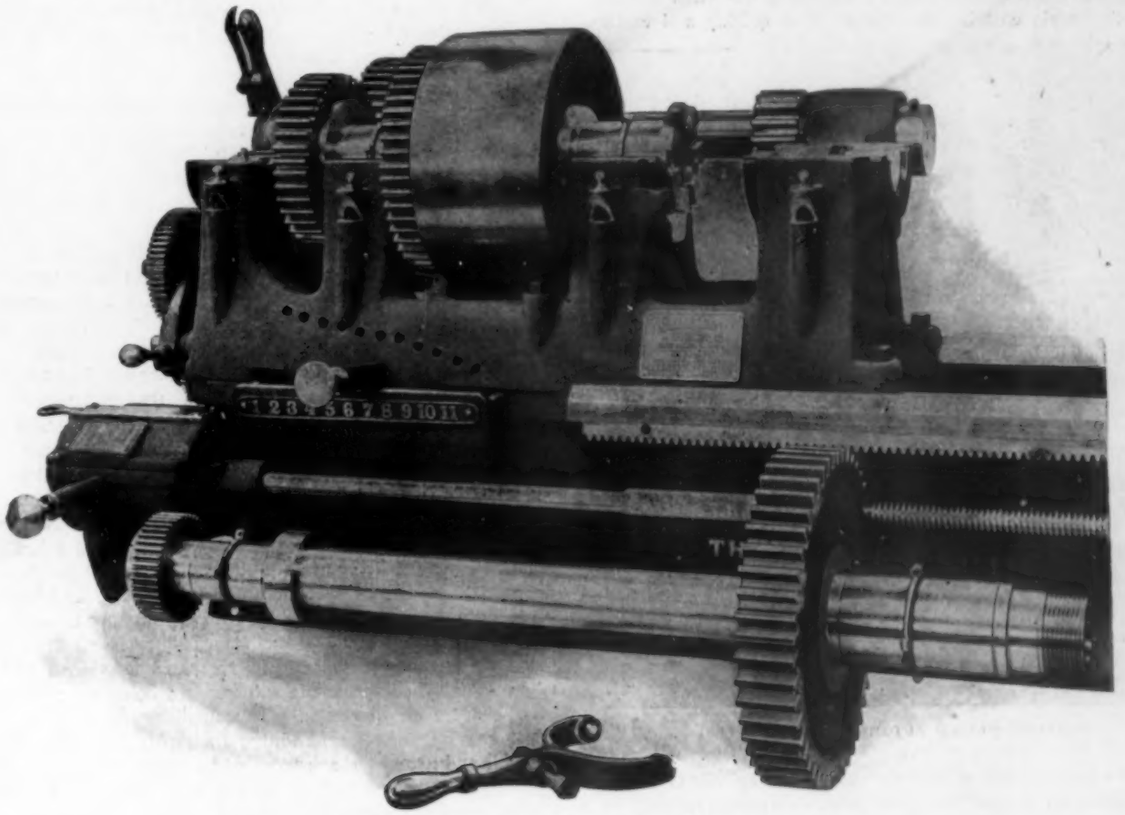


FIG. 2.—HEADSTOCK WITH SPINDLE REMOVED.

The Cambria Steel Co. last week paid $315,000 of the 5 percent notes which were issued four years ago, when the company was reorganized. There were originally $3,500,000 of these notes, but there now remain outstanding only $960,000.

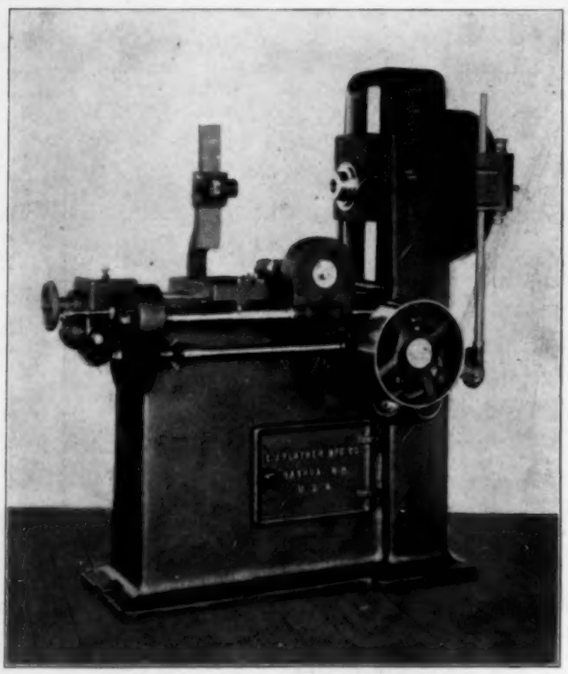
FLATHER 30-INCH AUTOMATIC GEAR CUTTER.

The machine shown below cuts spur gears to 30 in. diameter, 9 in. face and 4 diametral pitch. It is also made to cut spur gears to 36 in. diameter, 9 in. face and 4 diametral pitch. The design was intended to meet the requirements of modern plants where a powerful machine capable of very high speed is desired. The machine is heavy, well proportioned and calculated in every way to do its work without jar or chatter, while the gears, cut either fine or coarse pitch, are very smooth. Complicated movements have been avoided.

The head carrying the work spindle is clamped after the work has been adjusted by simply drawing forward a lever. The housing in binding the head is clamped as if solid, yet it cannot cramp the work spindle. This head is raised by a screw, driven by two planed bevel gears and a hand wheel located on the side of the machine. This has micrometer adjustment graduated to thousandths of an inch.

The work spindle is a large crucible steel forging, bored to fit a No. 12 B. & S. taper. The carriage is heavy and has wide bearings on the column. It is well gibbed and very rigid, and its felt wipers prevent the chips and dust from scratching the bearings.

A special feature is the device for locating the cutter central with the work, enabling the cutter to be quickly and easily



FLATHER 30-INCH AUTOMATIC GEAR CUTTER.

adjusted and clamped in position. The cutter spindle is driven by a powerful worm and worm gear, constantly running in oil, eliminating the jar and chatter often accompanying the entering of the cutter into the work. The return of the carriage is rapid, and the time lost for both returning and indexing are reduced to a minimum. This return motion is not affected by changing the speeds or feeds.

The indexing mechanism is locked after each index is made. It is impossible for it to operate after the cutter has entered the work or to index more than the space for which it is set. The worm driving index wheel can be disengaged from the driving rod by a fine tooth clutch, the work revolved in either way, and the clutch re-engaged. This clutch allows no chance of slipping.

The driving pulley is intended to run 300 revolutions per minute, but indexing as well as other operations can be accomplished by pulling the belt slowly by hand. None of the motions depend on momentum to complete their movement, or friction to carry them. Both the work arbor and cutter arbor are drawn into taper sockets by draw bolts, which also eject them.

The machine complete weighs 2,500 pounds. It is manufactured by the E. J. Flather Mfg. Co., of Nashua, N. H.

TEST FOR BRITTLENESS IN STRUCTURAL STEEL*

BY J. P. SNOW.

It is felt by many users of structural steel that mill inspectors should give more attention than is now usual to the detection of brittleness in our bridge material. Brittleness may be due to improper heat treatment or to segregated carbon or phosphorus. These defects may occur in material rolled from part of the slabs derived from a given ingot, while material rolled from the same melt or even from other slabs of the same ingot may be exceptionally good. If the ordinary tensile and bending tests of the heat from which the material in question is derived should be taken from those parts where objectionable segregation had not occurred and which had received proper heat treatment, the results would not expose the brittle features of the part supposed to be bad.

The desideratum is a practicable method of testing, which will furnish the inspector a means of detecting brittleness in any piece that comes from the rolls that he suspects may be objectionable. The object of this paper is to suggest a scheme which seems to me to answer this requirement. Prime essentials of a test of this sort, are simplicity and quickness of accomplishment. Mill men say, with reason, that they cannot hold stock until machine finished samples can be prepared and elaborate tests made. I am informed that much of the material now being used is many miles from the mill, on its way to the fabrication shop before the testing machine work is done on the specimens that are supposed to determine whether the material is to be accepted or rejected.

Determining the temperature of the metal after or before the last pass through the rolls is neither efficient, precise, nor conclusive. Delaying the piece before the last pass until the right temperature is reached, refines only the outer skin of the material. It is not the function of buyers to tell the manufacturer how he shall produce his steel or at what temperature he shall roll it, but rather to ascertain if the product which he offers is suitable for their uses. This can be best accomplished by testing the finished product in a direct way.

The scheme herein proposed is in substance a nicked bending test on crop ends of plates and shapes as they are trimmed at the rolling mill for shipment. A nicked bend is proposed because the object is not so much to see if the specimen will bend without fracture, as to open up the grain of the steel, to see whether it is fine and silky or coarse and crystalline.

It is proposed to take a generously wide piece of crop end so that the effect of the shear at the edges will not affect the result. It is deemed unfair to the manufacturer to depend upon narrow sheared specimens for this scheme of bending, because the injurious effect of the shear should not be assessed against the quality of the steel. Punched specimens are ruled out for the same reason. If narrow specimens with milled edges or punched specimens with reamed holes are used, the vital element of quickness of accomplishment is lost; for, while the specimens are awaiting their turn at the finishing machine the plate or shape from which they are cut is loaded for shipment or covered up in a pile of other stock. The scheme proposed will tell its story, if desired, before the rolling heat has left the piece. It can be executed and a decision reached, almost as quickly as the surface inspection of a plate can be made.

In detail the scheme is: to shear from the crop end a piece, say 12 inches wide, and nick it about 3 inches from one edge, preferably across the direction of the rolling, with a tool made for that particular thickness; clamp it in a hydraulic vise, and bend the free end over by power. The sketch shows in outline a possible bending vise. Both the vise and bending roller are to be actuated by hydraulic power which is always available in a rolling mill. The nick is proposed to be made with a tool like a blacksmith's flatter, having a raised bead on its face.

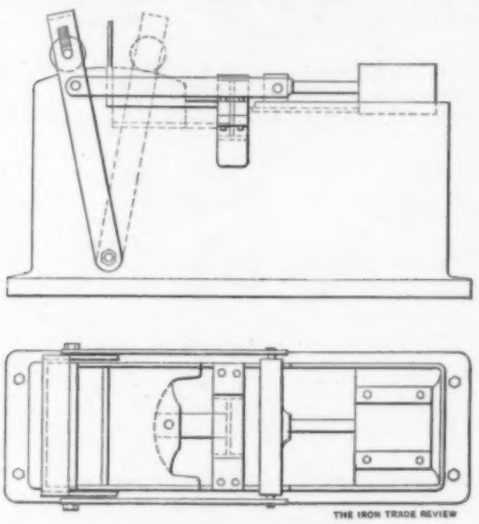
Nicked bending tests by impact have been recommended in the past by many investigators. In 1892, Le Chatelier advocated such tests before the French Committee on Methods of Testing, and since that time work on these lines has been done by Barba, Considere, Le Blant, Aucher, Fremont, Osmond and Charpy in Europe and by S. Bent Russell and others

* Read at the Atlantic City meeting, June, 1904, of the American Society for Testing Materials.

in this country. All of these experimenters sought to determine the resilience of the material by impact tests, thinking to replace the ordinary tensile tests by these determinations. But as shown in Johnson's "Materials of Construction," impact testing is surrounded by so many uncertainties that it has never been found commercially practicable for structural materials. Evidently the constant effort has been to make the test prove too much. In the scheme herein advocated the object is not a complete physical test of the material but simply an examination of the grain, as shown in the fracture, to ascertain if the material is brittle from any cause.

To insure a fracture in ductile material, the deformation must be localized by a nick. The form of the nick, its depth and shape must be determined by experiment, but for a beginning it is suggested that a depth of one-eighth the specimen be tried, the bead with which the nick is made to have the form of the Whitworth screw thread. Investigation may show that a single size of nick may be used for different thicknesses, but it is probable that each thickness should have its particular size. The nicking die may be struck by hand hammers, or a light quick acting steam hammer, may be provided for the purpose.

As to the method of producing the deformation it is possible that the distinctive difference between material that is good enough to be accepted and that which ought to be rejected cannot be brought out by making the bend with a press. It



PLAN AND ELEVATION OF VISE FOR BENDING TEST.

may be necessary to use impact, as was done by Fremont in a series of experiments described by him at the Budapest meeting of the European Railway Congress. These experiments show that a ductile steel may be broken short off by a blow of sufficient velocity. We know that ordinary structural steel when nicked and bent will invariably break unless it is exceptionally ductile and in very narrow specimens; hence it seems that a press bend on a wide specimen will certainly produce a break and show up the grain. A press bend if effective is preferable to a blow, on account of its more certain action and because it does not need adjustment for different thicknesses as would be needed if the bending was done by a blow.

It is believed that a test of this kind will expose coarse grain in steel, due to improper heat treatment, segregation, bad chemistry or any defect that tends to brittleness. The engineer may, under present specifications, demand certain chemical and physical qualities when buying steel. He may not be justified in prescribing the exact ratios of the many "ites" or the precise "eutectic values" of the various compounds that enter into the material which the manufacturer gives him for steel, but he may reasonably demand simple tests like that advocated here to satisfy himself that the material is free from brittleness.

In the past when puddled iron was the usual structural material, engineers depended largely upon bending tests to ascertain the quality of the output of the mills. Mr. C. C. Schneider has told me that he cared little for the tensile strength, elongation and other physical features of wrought iron as determined by the testing machine, but that he set great value on cold bending tests of scrap ends. Sir Benjamin Baker, when engaged upon the Forth bridge, stated that he placed more reliance upon bending tests of mild steel than upon testing machine determinations. With the steel of the present day we must test for ultimate strength to secure a grade that can safely undergo the ordinary shop manipulations and examine the chemistry to secure uniform composition, but have we not too much lost sight of the valuable old time feature of bending? The ordinary plain bending will not always show us the grain of the steel. In fact the width of the specimen and the radius of the bend are so selected in our usual specification that ordinarily good material will bend without fracture. Its ability to do this is the gauge for acceptance. To this end the sheared edges are planed, which defeats the very purpose of the test desired on account of the time involved in the opration. Moreover we bend but one specimen for each melt which assuredly does not attempt to control the rolling heat.

It is true that the proposed test may involve closer attendance of the inspector at the mill than our usual commercial testing requires, and it may be impossible to define the lines by which an inspector shall be governed in rejecting material, as sharply as can be done under our present system, but the inspectors' attendance can be arranged for and the results reached by Fremont give us a clew to what may prove to be a proper criterion for acceptance or rejection.

Fremont's paper shows that when a specimen of non-ductile material is bent, a hardened ellipse tends to form on the compression side which acts as a heel around which the fibers on the tension side have to stretch. If the specimen is nicked, this stretch is localized and confined to the fibers at the bottom of the nick, and breaking is sure to occur as is explained in detail by Fremont. If the material is somewhat ductile and the specimen narrow, the compressed metal flows outward. This flowing out assists compression and tends to decrease the stretch required on the tension side by removing the heel farther from the tension face, and hence helps toward a gradual break instead of a short one. This consideration explains the well-known fact that wide specimens will not bend so successfully as narrow ones.

If in the proposed nicked bend the specimen should break around Fremont's "ellipse of enlargement," instead of square across; or if it did not break clear through, we could safely conclude that the material was not brittle. If the break was square across and the fracture silky or but partly granular, we could presume that the heat treatment was good and segregation not excessive; but if the fracture showed crystalline facets or appeared dull and cokey it would be ground for rejection. After sufficient careful experimenting I am sure that workable limits can be fixed upon for the guidance of inspectors. It is possible that thick and thin material cannot be brought to follow the same law, but rules can be established for varying thicknesses. Material that is known to be good and that which is known to be bad, both from overheating and segregation, can be experimented upon and safe extremes established.

Metallurgical literature is filled at present with complaints of poor structure in rails and to some extent in other steels. The complaint is not quite so common in regard to structural steel, for the reason, probably, that it is usually in thin sections which cool to a lower temperature than thick ones, while passing the rolls. It is the case, however, that rolled beams have sometimes proved so brittle and untrustworthy that some engineers dislike to use them in railroad bridges. It is likely that the principal reason for this condition is too high heat during the rolling, due to their heavy section. If the crop ends of such beams are sheared up so that a section of the web or flange can be nicked and bent in the proposed machine the coarse structure if it exists will surely be exposed and the beam saved from discrediting its species when put into service.

A similar test on crop ends of rails could be made with the rails were passing the straightening press and many of those having coarse structure at center of head, open grain, lamination, pipes, sulphur flaws or other defects that one drop test in five heats does not detect, would be saved from going into the track and causing trouble for both user and manufacturer.

The above scheme of testing is submitted for consideration by our members. It is intended to supplement the usual tests for physical qualities and is suggested as a means of satisfying buyers of steel that their material is sound and free from brittleness. It is cheap in installation and operation and requires the inspector's continuous attendance at the shearing end of the rolling mill where he belongs. If properly executed it should tend to allay the agitation that is now going on among users of rails and structural steel in regard to heat treatment, open grain and other rolling mill defects. If the scheme is objectionable to manufacturers it is respectfully offered for their free criticisms.

The Use of Steel Cars.

The thirty-eighth annual meeting of the Master Car Builders' Association was held at Saratoga, N. Y., last week. The committee on prices for repairs to steel cars, one of the questions on the programme, and before American railroads to-day, recommended, among other things, that the cost or price of labor used for repairing steel cars should be based on a set price per rivet, including removing, fitting and replacing. Where the parts removed require straightening, this to be done and a separate price paid for the operation.

The committee found from answers to questions received from 23 roads operating steel cars, that the oldest of such cars have been in service eight years, and as yet no steel cars have been put out of service due to deterioration from age. They therefore had nothing definite on which to base a report as to the depreciated value of steel cars and cars constructed with steel underframes.

An exhaustive paper by William Forsyth dealt with the use of steel in passenger car construction, in which he accorded to car manufacturing companies almost all the credit for the development of the modern passenger car. At the same time he dwelt upon the fact that, contrary to the policy observed in strengthening freight equipment, larger capacity in passenger service had been obtained at the expense of strength by increasing the length of the car. Under these conditions American railroads are constantly running the risk of collision between strong steel cars with weak wooden passenger cars.

Attention was called to the general use of steel underframes for passenger equipment in foreign countries for many years, a larger part of the body of the best foreign passenger cars being of steel. It contributes to greater strength and stiffness and risk is greatly reduced. In this country, while the value of steel in car construction is realized and has been so largely employed for freight cars, its application to passenger cars has been surprisingly limited. In reference to the use of steel platforms, angles and plates, in end framing, Mr. Forsyth said that it is a half-hearted makeshift compared with the complete steel underframe which should be coming into use. While it might be proper to reinforce old equipment in the manner mentioned, there seemed to be no good reason why new passenger equipment should not be built with entire steel underframes.

Lake Superior Mining Institute.

The tenth annual meeting of the Lake Superior Mining Institute will be held on Aug. 16, 17 and 18, at Ironwood, Mich., with an excursion to Milwaukee and Chicago to visit the important iron and steel plants there, particularly the South works and ore docks of the Illinois Steel Co. The meeting is in charge of the members on the Gogebic range who are planning a very interesting program. Particulars will shortly be sent out by Secretary A. J. Yungbluth, of Ishpeming, Mich.

The property of the Zanesville Iron Co., Zanesville, O., which has been in the hands of a receiver for some months and twice offered for sale, has been appraised a third time, this time the amount being $36,000, necessitating a bid of $24,000 in order to make a sale. The other appraisement was $51,000.

The Balkwill Pattern Works, of Cleveland, heretofore at 970 Hamilton street, are now located in their new plant, 1301-3 St. Clair street, just east of Case avenue, which gives increased facilities for handling a growing business.

THE CAST IRON PIPE CONSOLIDATION.

The United States Cast Iron Pipe & Foundry Co. has issued its annual report for the year ended May 31, 1904. The income account compares as follows:

	1904.	1903.	1902.
Profits for year	$1,303,810	$1,370,542	$901,949
Written off for improvements, etc.	125,000	105,836	117,287
Balance	$1,178,810	$1,264,706	$784,662
Bond interest	71,640	68,555	77,415
Balance	$1,107,170	$1,196,151	$707,247
Other income	.....	32,573	3,937
Total income	$1,107,170	$1,228,724	$711,184
Previous surplus	853,724	671,718	496,424
Totals	$1,960,894	$1,900,442	$1,207,608
Preferred dividends	500,000	500,000	246,063
Balance	$1,460,894	$1,400,442	$961,545
Reserve for working capital	728,724	546,718	289,827
Profit and loss surplus	$732,170	$853,724	$671,718

The general balance sheet as of May 31, 1904, compares as follows:

ASSETS.

	1904.	1903.
Plants	$24,089,260	$24,126,482
Treasury stock	347,555	347,555
First mtg. bonds, Am. Pipe & Fdy., and sinking fund	423,347	374,037
Accounts and bills receivable	2,239,476	2,497,726
Insurance paid in advance	.....	6,096
Material, supplies, etc.	1,649,353	1,680,018
Cash	712,914	420,745
Totals	$29,461,905	$29,452,659

LIABILITIES.

Preferred stock	$12,500,000	$12,500,000
Common stock	12,500,000	12,500,000
First mortgage Am. P. & F.	1,500,000	1,500,000
Bills and accounts payable	560,864	1,112,719
Accrued interest and taxes	.....	43,835
Reserve accounts	1,668,871	942,381
Profit and loss	732,170	853,724
Totals	$29,461,905	$29,452,659

At the annual meeting of the company, held at Burlington, N. J., the retiring directors were re-elected.

For more than a year the United Staes Steel Corporation has been investigating to ascertain the amount of ore deposits remaining in its properties. It is understood that the results have been very satisfactory, showing that the company has about 750,000,000 tons. The investigation was carried on under the direction of the directors of the company and has been very carefully made. The results coincide very closely with the estimate made by Mr. Schwab in an affidavit filed in a New Jersey court about a year ago. Mr. Schwab then estimated that the corporation had in its mines about 700,000,000 tons of ore. Since that time the corporation has come into possession of the ore lands owned by the Union Steel Co., estimated at 40,000,000 tons, and the ore lands of the Clairton Steel Co., estimated at 20,000,000 tons. Mr. Schwab put a value of $1 a ton upon the iron ore in the ground.

In the Superior Court at Boston last week damages of $37,368 were assessed in favor of the Tremont Nail Co. against Robert C. Totten and N. B. Hogg, of Pittsburg, in an action brought by the company twenty-two years ago. The defendants, it was alleged, failed to furnish satisfactory gears for the nail company's plant at East Wareham, Mass., and, when the case was called for trial, comparatively recently, did not appear to contest liability.

The work of dismantling the Falcon plant of the American Sheet & Tin Plate Co., at Niles, O., will soon be completed, and one of the finest industries that Niles ever had will be no more, much to the regret of the people of that city. Some time ago the people of Niles made a proposition to purchase the plant, but it was not accepted.

The Otis Elevator Co. has declared the regular quarterly dividend of 1½ percent on its preferred stock, payable July 15.

A NEW PRESSED STEEL PULLEY.

Novel features of a pressed steel pulley recently brought out by Philips, Townsend & Co., of Philadelphia, as the invention of Ferdinand Philips, have made its appearance of special interest both from a mechanical and a commercial standpoint. Sheet steel pulleys have a history that has seemed to preclude much deviation from well-known forms of construction and methods of manufacture. This latest addition to the list is offered as new in several essential particulars, and is capable of

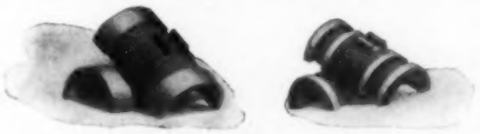
FIG. 1.—PHILIPS PRESSED STEEL PULLEY.

wide range in sizes as well as being adapted to simple methods of manufacture.

The hub of the pulley is of cast iron, designed like the hub of a split cast iron pulley, and thus retaining such hubs together with the mechanical appliances long used in cast iron pulleys. The hub is made in halves secured to the shaft by compression; for severer service set screw or key-seat may be used. Bushings are provided to suit all dimensions of shaft.

The arms are of triangular truss construction, the material being placed farthest from the neutral axis, where the strain on the arms is greatest, namely near the hub. Connection with the hub is made by countersinking the metal of the arm into the cast iron of the hub, relieving the hub rivets of shearing strain. The arms are united into one unit near the rim by means of a gusset plate, as in all truss constructions—or a dowel plate in this case in view of its engagement with the central rib of the rim, transmitting power from the rim to the spider, or vice versa, in a way that relieves the rim rivets of all strain.

For the spider construction the material selected may have a considerable range, according to the requirements



FIGS 2 AND 3.—FORMS OF BUSHING.

of strength. The arms are corrugated to provide strength for transverse strain. The principle exemplified in the work of the spider in power transmittal is that of a suspension wheel engaging a hub tangentially. The designer of the Philips pulley makes the point that, while the radial arm pulley imitates a cart wheel, which appropriately calls for a radial post under the axle as the most direct means of support, the strain on a pulley is different, being applied tangentially to the rim.

The rim is formed of sheet metal in the shape of a T, as shown in Fig. 6, the head of the T representing the face of the pulley. On the edge the metal is doubled over itself and finally bent in a direction vertical to the face, thereby forming the central rib. The weakness of all parting pulleys in that part of the rim where the halves are brought together was taken account of in this design. Ordinarily there is a possibility of wear on the belt from chafing because of the sharp edges of the metal of the two abutting halves not meeting exactly. In the pulley shown the rim lugs are an integral part of the rim and extend over the whole width of the pulley, imparting unusual strength at the joint.

The common use of two wrenches to put a pulley together has been obviated by the use of channel bars extending over the whole row of bolts. The heads of the rim lug bolts are bedded in these channel bars, as shown in Fig. 7, preventing them from turning when the opposite nut is screwed up.

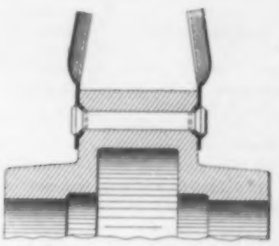


FIG. 4.—ENGAGEMENT OF HUB WITH SPIDER.

FIG. 5.—SPIDER AND RIM INTERLOCKED BY DOWEL PLATES.

The several parts of the Philips pulley are manufactured separately and of various gauges and finally assembled in the finished pulley. Manufacture and sales are carried on by the Philips Pressed Steel Pulley Works, an identified interest of Philips, Townsend & Co.

LaFollette Coal, Iron & Railway Co.

The LaFollette Coal, Iron & Railway Co., is to be reorganized under the same name and incorporated under the laws of New Jersey. The present company is a Tennessee corporation. Under the reorganization, the capital stock will be $5,000,000, and the officers thus far selected are H. M. LaFollette, president and general manager, and R. B. Winkler, vice president and treasurer. The erection

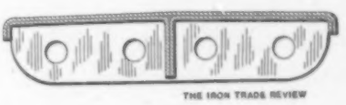


FIG. 6.—RIM FORMED IN T SHAPE.

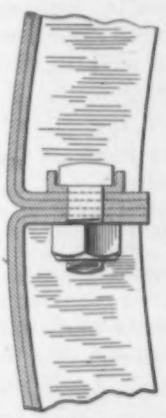


FIG. 7.—HEAD OF RIM LUG BEDDED IN CHANNEL BAR.

of a new furnace is planned of the same size as the present furnace, and work is to begin in September, on the new furnace. The plans further contemplate the erection of an open-hearth steel plant, work on which, will be commenced next March. New blowing engines have just been put in the old furnace, and the company is at work rebuilding the old blowing engines. It is expected to have both engines in operation by Aug. 1. The furnace is now in the hands of a new superintendent, who is vigorously prosecuting repairs, and expects to make a run of iron about the close of this week. H. M. LaFollette left on Saturday for London, on business in connection with the financing of the proposition. The Field-Evans Iron Co. will continue to represent the LaFollette Coal, Iron and Railway Co. as sole sales agents.

THE IRON TRADE REVIEW

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JUNE 30, 1904

FOUNDRY EDUCATIONAL WORK.

Frequent reference has appeared in these columns to the large contribution made by the various foundrymen's associations in the past ten years to the advance seen in that time in foundry practice and equipment. The reproach the foundry has commonly borne and the invidious comparisons drawn between it and the machine shop, are passing out of vogue. There has been a widespread and a marked foundry awakening. What the foundrymen's associations have done in this direction has been to create and maintain interest in foundry improvement, to bring together practical foundry operators for the discussion of the materials, the mechanical and metallurgical instruments of foundry processes, and of the methods that have given best success, and as a result, to create a body of foundry literature that is now the common property of the industry.

Special recognition has been given the good work of the American Foundrymen's Association both in Germany and England. It is noteworthy that in the effort recently made in England, resulting in the formation of the British Foundrymen's Association, stress was put upon the success of the American Foundrymen's Association. It was referred to as an organization "which has done such satisfactory work in the past and has given a great impetus to scientific thought as applied to foundry operations."

Perhaps it is the old story of a prophet honored abroad but without honor at home; but we cannot refrain from calling attention in this connection to that portion of the report of Secretary Moldenke, presented at the recent convention in Indianapolis, in which he referred to the very discouraging reception the claims of the association had received at the hands of foundry proprietors in the past year. Letters from foundries solicited for dues or for membership had often contained the statement that they were contributing so heavily to associations dealing solely with labor questions that the modest $5 or $10 asked for the continuance of the excellent work of the American Foundrymen's Association could not be afforded. The policy is certainly a short-sighted one. It would be hard to over-estimate what the educational work in respect to the foundry industry in the past ten years has done for the solution of the very questions that in the minds of some are only to be handled by defense organizations with large outlays of money. Bad practice and poor equipment are responsible for a large proportion of the so-called labor troubles, and it will be found generally true that the foundryman who is slowest to catch step with the improvement procession is the one most frequently involved in difficulties, that while ostensibly over wages, would be very readily adjusted if shop conditions were half way right.

It is a mistake to think that organization for fighting operations is the paramount issue with foundrymen. A sober second thought will suggest that without leaving this work undone, that which the national and the local foundrymen's associations are carrying on for the betterment of practice demands also to be done. Already far too heavy a draft has been made upon the generosity and enthusiasm of Secretary Moldenke and the handful of men who have participated actively with him in a work of which all get the benefit while relatively few bear the burden of support.

LARGE EXPORTS IN STEEL RAILS.

The Government statistics of imports and exports in May at last show results for the large export orders of steel rails which were taken some time ago. The exports of steel rails in May amounted to 41,388 tons, or nearly 3,000 tons more than the exports in the first four months of the year. Rail exports have now reached really important proportions, since the May movement was at the rate of a trifle over half a million tons a year. Pig iron exports in May showed a decrease, the amount, 2,031 tons, being the smallest of any month this year. Crude steel exports show an increase of over 3,000 tons above April, but still did not reach the tonnage of March. The following table shows our exports by months of pig iron, crude steel and steel rails:

EXPORTS IN 1904, GROSS TONS.

	Pig Iron.	Steel.	Rails.
January	6,742	1,860	1,740
February	3,429	26,205	8,465
March	3,954	36,908	17,873
April	2,898	28,276	10,460
May	2,031	31,527	41,388
	19,054	124,776	79,926

The total exports of those iron and steel products of which the weight is reported amounted to approximately 107,500 gross tons, showing an increase of 32,148 tons over April, but as the increase in crude steel and steel rails was 34,179 tons, there was a net decrease in other items. The following lines showed slight increases: Scrap, wire rods, iron sheets, steel sheets and structural shapes. The following items showed slight decreases: Bar iron, bar steel, iron rails, hoops, tin plate, wire and cut and wire nails. The decrease in wire, however, was inconsequential, being from 11,549 tons to 11,476 tons. The total tonnage of exports for the eleven months of the fiscal year was approximately 557,000 tons against 276,000 tons in the same period a year previous.

The imports of iron and steel in May showed an increase of about 1,000 tons over April, being approximately 25,000 tons. This is due wholly to an increase in iron and steel rails from 3,903 tons to 8,918 tons, which more than makes up for decreases in various minor lines. It is quite probable that these rails imported are really scrap. In fact, we know of one transaction which would make up a large part of this tonnage, an American importer having purchased old rails abroad for re-rolling purposes, expecting them to be dutiable as scrap, whereas the Government held them for a higher duty, and the loss was such that similar transactions will not be made in the future. The imports of pig iron in May were 5,184 tons, against 7,713 tons in April.

STEEL AS MANKIND'S PROTECTOR.

The terrible disasters which have occurred in the United States during the past six months, causing the loss of many millions of dollars' worth of property and of the lives of more than fifteen hundred men, women and children, have, one after another, with cumulative force, made a most impressive appeal for better construction on land and sea.

First came the heart-rending Chicago theatre fire, in which hundreds met frightful death. It is true that the management of the playhouse was wretched, but the primary cause of the disaster was the absence of a fire proof curtain. The Baltimore fire taught some valuable lessons, of which the principal one was that, no matter of what material a building is composed, it can not be depended upon to resist without limit heat from burning buildings on all sides of it; that is, if a business section is to be safe from the flames, not merely occasional structures, but all buildings in that part of the city must be constructed as nearly fire proof as possible. In the investigation of the causes of the Slocum steamship disaster, much has been said about lack of fire drills, rotten life-preservers, antiquated life boats and other poor equipment, but the real, fundamental trouble was that the boat was made of wood. With all equipment of the best and with discipline of crew perfect, no wooden vessel can be considered safe from destruction by fire. The steel boat is the only one that will never be in danger of burning.

These hundreds of precious lives and these millions in property have not been lost without stimulating negligent owners of buildings and vessels to which the people resort in large numbers, to a better discharge of their duties, and public officials will be more diligent for a time, at least. But the principal benefit to the world will be that in the years of the early future steel will become the servant of mankind to a greater extent than if disasters had not demonstrated, at frightful cost, the ease with which other materials can be destroyed. This inevitable increase in the use of steel will be contemplated by the maker and seller with satisfaction, not merely as a business proposition, but with that finer sense of appreciation of those who realize that the greatest satisfaction that can be found in any business is the knowledge that in a signal way it can be made the valued servant of man.

In no particular does the work of those who have steadily cheapened the cost of steel so appeal to us as among the highest human achievements, as in the means they have provided for protecting life against one of the most destructive of the elements.

The Labor Situation.

BETTER CONDITIONS IN CHICAGO MACHINE SHOPS.

CHICAGO, June 28.—The Chicago Metal Trades Association, working in conjunction with the national organization, is meeting with considerable success in its determined fight against the striking machinists in this city. All the shops which were affected have been started up again, some with a full complement of hands and others partly so. Capable and reliable men are being picked up all over the country and sent to this city to fill the strikers' places, and it is expected within a short while to have all the men that are necessary. Originally from 1,000 to 1,200 men, including the metal workers, went on strike, but since the two organizations opened employment headquarters at 88 LaSalle street, which are in charge of Robert Wuest, secretary of the National Metal Trades Association, nearly 400 men have been brought from other cities, and a large number of the more conservative men in the local union have been prevailed upon to give up their cards in that organization and go back to work. Wherever trouble has occurred with the strikers, and this has happened in eight or nine cases, injunctions have been taken out immediately by the Chicago Employers' Association in behalf of the shop in trouble. Each man who is hired by the association is required to agree to the following principles, as well as sign the contract given below:

1. We recognize that the interests of both employer and employe should be properly protected, and that these interests must at all times rest on the fact that employer and employe are both interested in the results of the work in which they are engaged.

2. We recognize that any restriction of the enterprise of the employer or the energy of the employes, resulting in depreciation of the quality or quantity of product, is detrimental to the mutual interest of both.

3. We recognize the justice of the recommendation made by the Coal Strike Commission appointed by President Roosevelt: "That no person shall be refused employment, or in any way discriminated against, on account of membership or non-membership in any labor organization; and that there shall be no discrimination against, or interference with, any employe who is not a member of any labor organization by members of such organization."

. We recognize that there should be no restriction to the opportunities that may be offered to deserving boys to acquire a trade, and that employers and employes should join in their efforts to instruct such apprentices, provided they be employed under written contracts for a specific time of service.

5. We recognize that sympathetic strikes, lockouts and boycots are relics of barbarism, because they result in no permanent benefit to either side of a contest, and inflict unjust and unfair injury on the public, who depend on our joint efforts for their comfort and welfare.

6. We recognize that as the realization of mutual benefits represented in profits and earnings from our joint labors, depends largely on the employer finding a suitable market for the product, he can best determine the methods of work, the selection of employes, and the character of work to be performed by each.

THIS AGREEMENT, Made and entered into this.... 190.., by and between....., hereinafter called the employer, and ..... hereinafter called the employe.

Witnesseth that, Whereas, The parties hereto are desirous of securing stability in their relations as employer and employe and equal protection of their respective rights, and whereas both parties accept the principles set forth on the back hereof and consider same a part of this Agreement; therefore they hereby agree to and with each other as follows:— —

Article I. That for the period of.....from the above date. the employe agrees with the employer to perform in a loyal. faithful and workmanlike manner the services required of him by the employer in the capacity of.....; and the employer agrees with the employe, in consideration of such service to pay the employe as follows:—

When working by the .....for such period, payable weekly.

Article II. It is understood and agreed that the employe reserves the right to withdraw from this contract and quit the service herein agreed upon if sick, incapacitated or if the employer violates this contract; but shall not so quit this employment during the life of this agreement on account of the grievance of some other person or persons, or in furtherance of any strike or demand on the part of any other persons.

Article III. It is hereby understood that the employer reserves the right to suspend or terminate this contract if at any time work may cease or slacken, or the services of said employe be found unsatisfactory. The services of the emplove shall not be deemed unsatisfactory within the meaning and spirit of this contract nor shall he be discharged or suspended, merely because of the demand or request of any person or association. And in case the employer suspends the employe during the period of this contract, the employer agrees, when putting men on, to give preference to said employe over men not having such contracts, and as between men having such contracts to give preference to those who have worked the longest time under such contracts.

Article IV. It is further agreed that it either violates this contract he shall forthwith pay to the other as liquidated damages the sum of $15 which may be deducted from any money owing him by the other party.

Article V. It is mutually agreed between parties hereto that this written agreement constitute the entire agreement and understanding between the said parties.

The foremen of the local plants, as previously reported, have been organized into an active body, and are co-operating with their employers to break the strike. Under the new shop rules which were promulgated some weeks ago and which were printed in this paper, abolishing the restriction of output and permitting employes to operate more than one tool wherever necessary, a great saving has been effected in wages and a gratifying increase has been brought about in the shop's output. Local manufacturers now feel that they are at last in position to equitably compete with concerns in other cities whose plants have not been under the burden of union domination to the same extent as those in Chicago.

UNION ASSAULT UPON A CHICAGO ATTORNEY.

(Special Telegram.)

Chicago, June 29.—At a meeting yesterday afternoon of representatives of the National Metal Trades Association, Chicago Employers' Association, American Anti-Boycott Association, Building Contractors' Council, Illinois Manufacturers' Association and the Chicago Bar Association, it was decided that no pains or expense be spared to identify the assailants of Attorney A. C. Allen, legal adviser of the Chicago Metal Trades Association, and bring them to justice. Each of the above associations offered to bear a share of the expense of hiring detectives and of legal fees that might be incurred, averring their belief that the assault was the result of an organized conspiracy. As told elsewhere in this issue, Attorney Allen was set upon and nearly killed, being taken home unconscious. Rewards aggregating $3,000 have been offered for the arrest of the assailants.

REDUCTION IN PITTSBURG FOUNDRIES.

(Special Telegram.)

Pittsburg, June 29.—Officers of the National Founders' Association and molders are conferring on the molders and coremakers' wage scales. The conference opened yesterday and is on again today. No agreement has yet been reached. The founders demand a reduction of 30 cents per day after July 15 per journeyman molder and coremaker, and the right to reduce individual molders to $3 a day.

NATIONAL METAL TRADES ASSOCIATION.

Cincinnati, June 27.—During the past week the boiler makers in New York have been more troublesome than at any time during the strike. On Monday, June 20, one Kennedy was arrested and held in $300 bail for assault on an employe at Christopher Cunningham's plant in Brooklyn. The shops are gradually improving their conditions each week. The rank and file of the strikers are much dissatisfied with the strike, and desire to return to work, but are in fear of personal violence.

All the machine shops in Chicago are now running, and some have all the men they require. The N. M. T. A. is continuing to send in men. Many of the workmen in Chicago have broken away from the union and signed individual contracts with their employers. Secretary Wuest has been particularly successful in inducing individual workmen to do this.

On Friday, June 24, at Chicago, a murderous assault was committed on Attorney Alexander C. Allen. Mr. Allen is the attorney who brought nearly all injunction suits in Chicago restraining strikers from lawless and criminal violence, and represented many local organizations in that city. He has also acted as the counsel of the N. M. T. A. in several cases, and is the Chicago attorney for the American Anti-Boycott Association. As Mr. Allen stepped out of the elevator on his way home Friday evening, three men assaulted him with iron bars, rendering his unconscious, and his condition is still critical. It is supposed that the murderers really intended to attack Secretary Robert Wuest, of the N. M. T. A. Steps have been taken by all the employers' organizations in Chicago to run down not only the perpetrators of the outrage, but the instigators as well, and some sensational developments as to the inciters of the crime are expected. This attack shows that union thuggery has reached a worse stage of progressive devilishness than ever before, and that evidently a broader field of crime is now contemplated. Assaults hitherto confined to non-union workers now shift to an attack on the life of an attorney who dares bring an injunction suit. Mr. Allen is a man who is personally beloved by all who know him, and was without enemies save among those whose criminal operations he has been instrumental in putting to an end by injunctions.

LABOR NOTES.

A general readjustment of the scale of wages for piece workers is being made throughout Altoona machine shops and car shops of the Pennsylvania railroad, for the purpose of obtaining a more justly proportioned scale on all kinds of work. An official of the company at Altoona states that he has received no intimation from headquarters which would in any way indicate that the rumor that all departments of the Altoona shops, excepting the round house and foundries, would be closed for some time during the summer, is true. He says there will be plenty of work throughout the summer to keep the present force busy.

The building trades employers of the Cleveland Builders' Exchange will support the Forest City Steel & Iron Co. in the fight made against the employment of non-union men on the new Rockefeller building in that city. The Trades and Labor Council has decided not to permit any union men to work on the building until the union men are allowed to work on the structural material. At present there are no other workers employed except in the erection of the steel, and there has been no trouble except that reported last week.

In a clash between strikers and men hired to take their places by the Dominion Iron & Steel Co., Sydney, C. B., June 24, thirty persons were injured. A gang of Italians was intercepted on its way to the works, and, after they refused to remain away, a free fight was started.

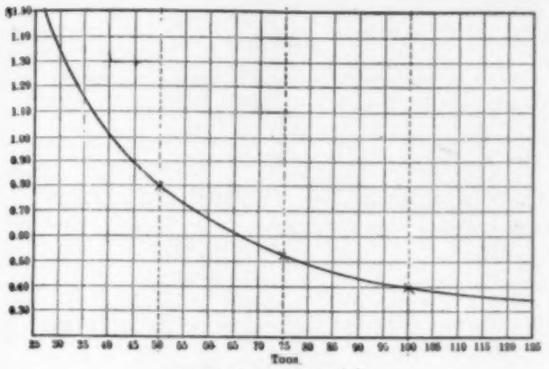
The carrying of a banner with offensive inscriptions in front of the plant of the W. P. Davis Machine Co., Rochester, N. Y., has been stopped by order of court. A fine of $50 and costs has been assessed against one offender, who has disappeared, and a walking delegate may be involved in a charge of contempt of court.

At the convention of the Amalgamated Sheet Metal Workers' International Alliance, held at Buffalo a few days ago, President Richard Patisson, of New York, protested vigorously against the establishment of open shops and urged the delegates to combat the open shops with every possible effort and to hold out strongly for union shops.

Foundry Costs: Their Analysis and Reduction.*

BY HENRY HESS.

In order to economically manage a foundry it is necessary to know accurately the various elements of expenditure and, having these, to analyze properly their relation to one another and to the product. The manager is then in a position to check at once any rising tendency of the costs or to bring about a reduction, as the analysis points out an opportunity. No doubt all of this can be, has been, and is being done successfully today by many a foundryman to the entire welfare of the business without any conscious or formal analysis or detail accounting. There are many managers of the old school who, through personal experience, a high order of native talent, and close touch with every detail, get along without other aids. But in these days of large and growing concerns, it is neither advisable nor safe to rely utterly on one man, no matter how capable, nor yet to the best interests of all concerned to burder the higher officials with the infinite detail work needed to get into sufficiently close personal touch with the entire working routine.



GENERAL EXPENSE (*a*)

It is quite possible so to present the vital elements of cost that the managing head can at once grasp all salient features, see whether cost is stationary or not, and determine where effort must be applied to check a rise or bring about a reduction. The necessary work forming the basis of analysis can be readily performed by a very ordinary grade of shop clerk, once the routine has been fixed.

To start with, all of the elements of cost must be enumerated. It is well also to assign to each element a value, not so much with the idea that this value is absolutely correct, but rather to have some basis of comparison; experience may be relied upon to gradually bring about correct values. The figures given hereafter are to be taken as having merely an illustrative value; no attempt is made to provide a record of actual or proper costs.

In illustration, the elements of cost are divided among a few main heads as follows, it being understood that for actual work a subdivision more in detail must be used; to enumerate them fully is outside the province of this paper, in which it is intended merely to present in general outlines a successfully used plan:

(*a*) General expense.
(*b*) Fixed salaries.
(*d*) Power.
(*e*) Miscellaneous materials.
(*f*) Labor.
(*g*) Pig and other charging metal.
(*h*) Smelting material.
(*j*) Light.
(*k*) Recovered material.

The collating of the actual amounts of the various items as incurred is best done weekly rather than monthly or at other long intervals, as that will permit the recognition of a defect in time to trace it correctly to its cause and to apply a remedy. Should a longer interval be determined on, that should be four-weekly rather than monthly, in order to avoid the disturbing effect of the varying number of working days in different months, and also because it fits in better with the weekly pay accounts. Such charges as are based on a monthly rate can very readily be converted into an annual and from that to a weekly rate.

Apportionment of the various elements of cost to main divisions is made in accordance with readily apparent principles:

(*a*) General expense: Depreciation and interest charges.

(*b*) Fixed salaries: All salaries to persons having a fairly certain tenure of office; salaries to minor clerks that are likely to vary in amount should be entered under labor.

(*d*) Power: All charges directly connected with the power plant.

(*e*) Miscellaneous materials: Sand, flour, chaplets, wire, molders' implements, etc.; in fact, all materials not accounted for under heads *g* and *h*.

(*f*) Labor: All payments made to workmen and other persons. Includes all pay not taken care of under head *b*.

(*g*) Charging metal: Everything charged into the cupola, except fuel and flux; also all "medicine," whether added in the cupola or ladle.

Note.—For purposes of comparative analysis these materials should be rated at fixed values, although they will be purchased at more or less fluctuating rates. In order to take care of the difference between the assumed fixed and the actual flucutating cost, the difference should be determined at suitable periods, and this difference debited or credited, as the case may be, as a "market equalizer" affecting the profit and loss account. Should the fluctuations be large, it will be advisable to make use of a "special charging account" to properly analyze the influence of various brands of iron and scrap on the cost of the charge. Preference is to be given to determinations at short intervals,—say quarterly,—rather than longer ones, as changes can then be ordered made in time to effect economies.

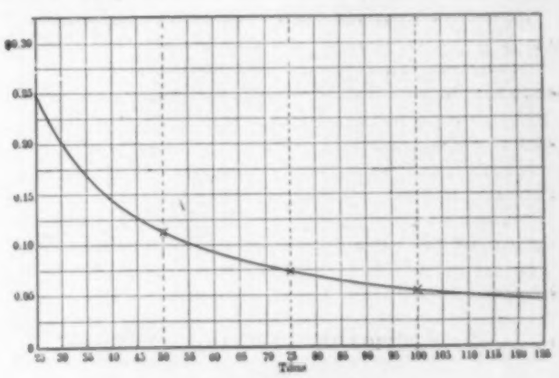
(*h*) Smelting materials: All fuel and flux charged into the cupola; fuel recovered from the bed is to be charged again into the cupola. Fuel for other purposes, such as drying ladles, cores, and molds, is to be charged under head *e*.

As the market price of these materials also is apt to vary, and as it is desirable in the analysis to make use of a fixed price, the difference is taken care of by a "market equalizer," as previously explained.

(*k*) Recovered material: This account takes care of all difference between molten iron obtained from the cupola and the salable castings. It is made up of:

1. Equipment: Castings for foundry use, such as weights, flasks, chills, etc.

2. Upkeep: Castings made to repair or replace wastage of foundry equipment.



FIXED SALARIES (*b*).

3. Gates: Gates, cast core irons and frames, sinking heads, and sprues.

4. Wasters: All defective castings.

All of this material will either be present in the foundry or will be charged into the cupola as scrap. In the latter case it is certainly to be rated only at the same value as purchased scrap. In the first case it is conservative policy to rate the material no higher than scrap, as it is very questionable whether it would bring a higher return if sold.

As the material for producing the items under this head

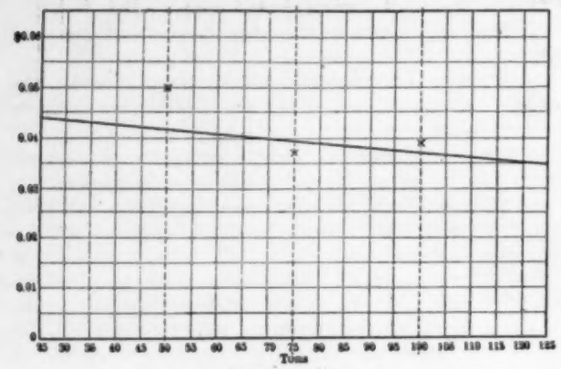
*Paper read before the Engineers' Club of Philadelphia.

has been entered as a charge, its value should be credited to the total costs in order to give a true net total cost.

(*j*) Light: All charges directly connected with the shop lighting.

It is to be remembered that the divisions as here cited are merely suggestive of underlying ideas and principles; in actual practice a larger number will be used, and many will be divided and subdivided. The labor charge, for instance, should be split up into direct and indirect labor, etc.

In general it will be most convenient to reduce all elements



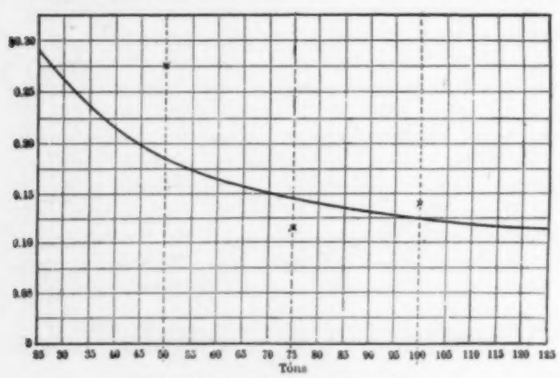
POWER (*d*).

to a basis of cost per 200 pounds, or one-tenth ton, as a compromise that avoids the high figures for output when figured in pounds and yet allows ready reduction to the pound rate generally used in the sale of castings.

In comparing costs at different periods it will not do simply to divide the total cost incurred during a week by the total pounds producing during that week and take the result as a pound cost, to be compared with that of some other period. Every manager knows that the cost per pound rises when the product is small and decreases with an increasing output, and will take this into account when comparing costs. But such allowance is made as a matter of judgment only. Now, judgment is a very good thing, but certainty is still better if it can be made to take the place of judgment; in this particular instance that can be done and quite readily. As an example, say that the fixed general expense charge for a week is $1,600; with the output 50 tons, the charge per 200 pounds is then $0.80; but for a doubled output of 100 tons the charge per 200 pounds would be halved to $0.40. These values, plotted as a curve for various rates of output on the horizontal scale, give the diagram *a*.

Similarly, that other element of fixed cost, fixed salaries, is plotted as diagram *b*.

Fluctuating elements of cost are also so plotted, though



MISCELLANEOUS MATERIALS (*e*).

from the nature of the case the curves cannot be determined by direct calculation, but must be approximately laid down in accordance with experience and judgment. In this way the diagrams for power (*d*), for miscellaneous materials (*e*), and for labor (*f*) are laid down as decreasing with an increase in production. Pig and other charging metal (*g*) and smelting material (*h*) are laid down as horizontal lines, as these items are not apt to be materially affected by the amount of the output.

All of these curves or lines I term ideal curves. Their total will give an ideal total cost of production, as shown in diagram *i*, by the lower line, per 200 pounds of melted iron. If all the iron melted were turned into salable castings, this lower, or 100 percent, curve could represent also the cost of salable castings. The other curves give the cost of salable castings for the various ratios of such castings to the total iron melted. These curves are determined as follows: Take the total cost per 200 pounds of melted iron as $3.40, the value of recovered iron as $0.20, the salable castings as 80 percent. Then the 160 pounds of salable castings would cost as much to produce as the 200 pounds of iron melted, less the value of the recovered iron; *i. e.*:

Cost of melted iron	$3.40
Value of recovered iron	0.20

Cost of the 80 percent of salable castings is the balance.$3.20 and 200 pounds of salable castings would cost

$$\frac{3.20}{0.8} = \$4.00.$$

This can also be put as a figure to be added to the cost of the melted iron from the equation

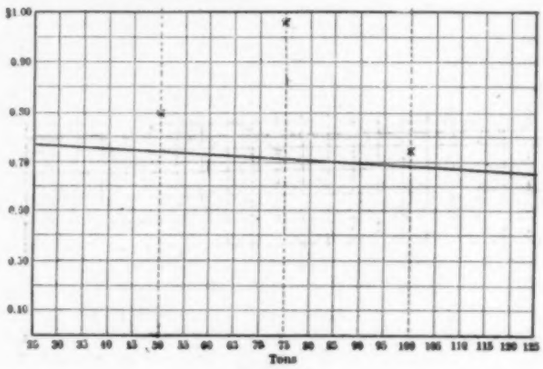
$$s = \frac{1}{p} - 1\ (i - r), \text{ in which}$$

s is increase to be added to cost of melted iron to give cost of salable castings;

p is percentage of salable castings divided by 100;

i is value of melted iron;

r is value of recovered iron.



LABOR (*f*).

Considering in illustration values from diagram *i*: The actual cost per 200 pounds of melted iron is $3.73, $3.09 and $3.00 in the three periods shown. According to the ideal curve, the lower one marked 100 percent, these costs should have been $3.40, $3.07, and $2.90. Running up the first week's cost, the manager finds that of the various items the cost for miscellaneous materials (*e*) was by far the higher as compared with the ideal laid down, and instructed the foreman to cut this. Next week the total is still found too high; following this through shows that miscellaneous material cost has been reduced actually below the ideal, but that the labor element (*f*) went up materially; investigation in the foundry showed that the foreman economized on sand mixtures and facings to such an extent as to apparently increase the cleaning labor; the apparent relation between these two elements of cost should be followed up to see whether it is actual: The best way is by a further subdivision of these two elements for some time. As before stated, the analysis is here carried only far enough to explain the idea; nor must the figures given be considered in any other sense.

The following week the total is still found high as compared with the ideal, but more nearly satisfactory.

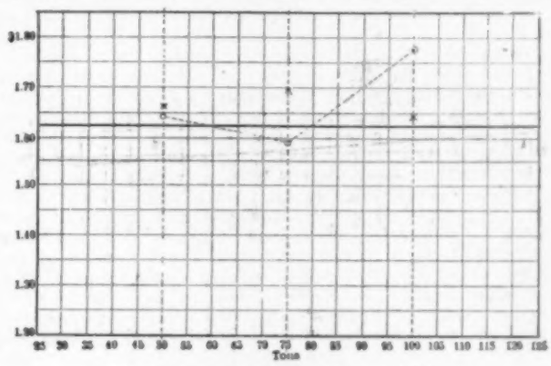
Looking further, the manager finds that the cost of the salable castings is $4.41, $4.90, and $3.28 in the respective periods (entered as + points in the diagram), whereas they should have been but $4.00, $4.44 and $3.08, to correspond with the ratios of 86, 60, and 90 percent of salable castings. The very low ratio (60 percent) of salable castings in the second week is entirely too poor a showing to pass without comment. Tracing upward, it is found that the smelting cost

(*h*) was very low, leading to the inference that economy of fuel had led to the very large amount of wasters; investigation in the foundry bore this out, as too dull iron, consequent on the use of insufficient coke, caused a lot of scrapping.

From what has been said it is apparent that this plan of plotting records and methods of analysis based on comparison with ideal conditions keeps the busy manager up to date in his knowledge of what is actually going on, not only as regards totals, but also in detail, so that he is always in position to find a sore spot and apply a remedy based on certain knowledge, backing up his judgment. The method has the further advantage of showing whether the remedy applied really did result in the cure desired or whether it merely brought about a transfer of the sore to some other place.

Knowledge of the fact of such close analysis being made will keep the foreman and others responsible tuned up to concert pitch. It has, in my experience, immediately on adoption resulted in a decrease in costs; showing the foremen actual figures will avoid much of the bad feeling easily raised with well-meaning men when their results are criticised. Being human, they are more or less inclined to ascribe criticism to prejudice. Under this method of absolute analysis responsibility will be placed where it belongs, and it will be possible to bestow praise judiciously in the proper quarter—the old adage to the contrary notwithstanding; "soft words do butter parsnips" to the decided advantage of the firm.

In enumerating the elements of cost, mention was made of a market equalizer to take into account the fluctuating value of the materials bought; this is brought in as follows: The actual unit value of material used at any time is its average cost price; this may, according to circumstances, be either

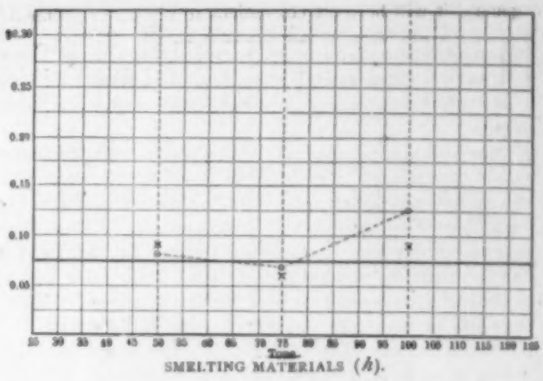


PIG AND OTHER CHARGING METAL (*g*).

higher or lower than that due to the current market rate or than the ideal assumed. These actual costs of such material are plotted into the diagrams *g* and *h* with the sign O. The actual total costs as modified by the equalized are also added on the total diagram *i* with the signs * and ×. Consulting this, it will be seen that a recent purchase of pig and coke at high figures had the effect of raising the cost of the last week's output considerably—from $3.00 to $3.20 per 200 pounds of molten metal and from $3.28 to $3.50 for salable castings. The actual utility of separately considering this element is evident, as otherwise the more nearly satisfactory cost of production, so far as under the control of the foundry foreman, would have been obscured. The actual cost due to the market price of the materials being given will allow sales being based on that.

Lighting has not so far been taken into account as an element of cost; this because it is dependent upon the season and the weather, conditions that are not subject to control. This variable character would to a certain extent impair the value and reliability of the main analysis for purposes of cost comparison. I therefore prefer to plot it as an addendum diagram *j*, and to consider its influence on costs separately. In determining sales prices this cost item must, of course, be added.

The totaling diagram, *i*, would be too greatly obscured were curves drawn in for more than each 10 percent of variation of salable castings. It is, however, a very simple matter to interpolate points as desired: Say the 95 percent line is required at about 60 tons output. Mark the intersection of any vertical in that neighborhood,—say 50 with the 100 percent curve,—then the intersection of the next heavy vertical at 10 tons farther along with the 80 percent curve; then of the next heavy vertical, at 70 tons with the 60 percent curve; now pencil a curve through these intersections. As 95 is midway between 100 and 90, the intersection of the curve just penciled in with the vertical midway between those cutting the 100 and 90 percent curves will be a point on the 95 percent curve sought. This latter may then be continued both ways approximately parallel to the curves between which it lies.



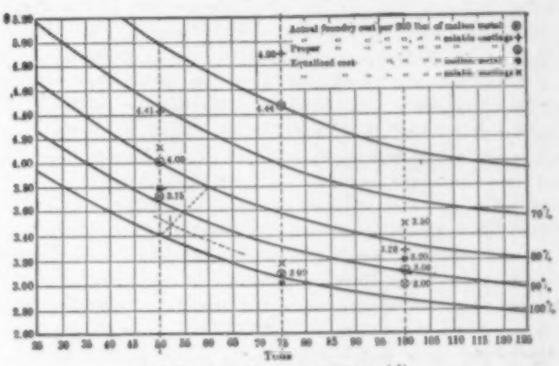
SMELTING MATERIALS (*h*).

In conclusion, I may be permitted to point out that this method of cost analysis is not by any means restricted to the foundry, but is applicable advantageously to all lines of work in which the cost of production varies necessarily with some other factor; in most lines of manufacture that factor would be the output. Although rather lengthy to describe, the plan is not at all formidable in actual use. All the data required are assumed as available, being needed for any arrangement of recording costs that may be in use, so that there remains only the work of laying down ideal curves and of plotting in the actual values; this latter operation is a very simple one that can be quickly mastered by the average costing clerk.

It will give me pleasure to answer any questions as to any point that I may not have expressed myself clearly on, or to go privately more fully into matter that time will not serve to take up here.

DISCUSSION.

Walter F. Ballinger.—The value of estimating costs I think cannot be too much emphasized. An incident occurs to my mind; a gentleman was telling me a few days ago of a certain firm that failed in business. Something like two years ago this firm (with whom I am well acquainted) asked me if I could get them the privilege of going through the factory of one of their competitors. I said, "Very likely; I'll see;" so I went to a member of the competing firm and asked if there

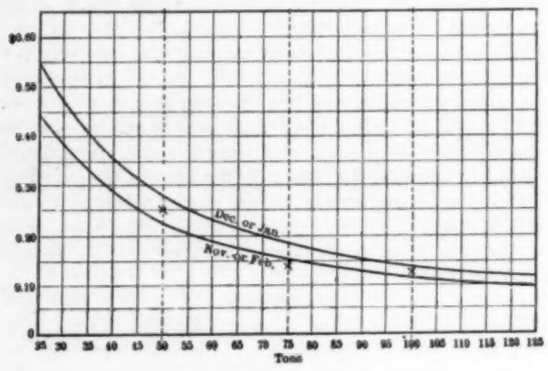


TOTAL COST OF PRODUCTION (*i*).

would be any objection to taking one of his competitors through the building. He smiled and said it depends entirely upon who it is. I mentioned the name and he said, "Not for a thousand dollars." He gave as his reason for objecting the fact that this firm did not know how to estimate the cost or value of the work they did. Sometimes they would bid extremely high and sometimes below cost, and his firm would fail to secure work where he knew he was reasonably low, because of the firm that did not know how to estimate. The firm that did not know how to estimate has gone up.

H. D. Hess.—I have been very much interested in the paper this evening. There is one point which I fear is somewhat foreign to the subject, but if Mr. Hess will kindly answer I will be very much obliged. It often occurred to me that it might be desirable to have the costs of castings of different weights and grades kept separate. It is evident that within a foundry's capacity the heavier the individual castings the greater the output. On light work the production would be cut down. Is it considered, in general, that the cost per pound of castings for the week or month will give a fair estimate of the cost of castings of that average weight, or is it usual to differentiate the costs in order to obtain the costs of heavy castings that are comparatively simple; that is, with little core work, and the costs of light castings, either simple or more complicated?

Mr. Hess.—It cannot be said that there is any generally recognized practice of foundry cost keeping. I think the foundry is less well taken care of in the matter of following costs than any other manufacturing department. I know that in some foundries cost groups are determined by casting weights, in others the amount of core work is the basic factor, on the general assumption that core work costs more for labor. The fact of the matter is that all of these divisions are too broad. If all castings up to five pounds are classed together, then those up to 50 pounds, and so on, and the costs carefully determined, most likely castings only 5 pounds in weight would cost far more in labor than the others. Lumping is not at all fair. It is necessary to get detail cost of individual pieces. That means an amount of work that many foundry



LIGHTING COST (*j*).

managers think totally impossible. As a matter of fact, with a carefully devised system of following costs these may be so collated as to entail almost no extra expense; but such expense, even a quite high one, is justified, as it is almost impossible to overrate an accurate knowledge of all of the detail costs of one's business. It is that which puts one in position to get and to do business at a profit. Usually if the foundry as a whole shows a profit, that is all that is required; under that management a great deal of work will be taken at an absolute and direct loss; but the foundry making the best showing in actual earnings at the end of the year will be that which made a profit on all of its business.

The point to be emphasized is that everything must be considered for itself and then in its relation to other things. If, under the grouping system, the five-pound group were a relatively large portion of the total and the result not satisfactory, investigation should point out the five-pound group as in fault. If then the analysis as laid out does not disclose the cause of the fault, that means that a more detailed analysis is necessary for the five-pound series; such detailed analysis might be kept up later or not, as might be deemed advisable. The fact is that it is almost impossible to lay down any specific rule of universal applicability. No routine that may be laid out will permit dispensing with the element of common sense. It will always be necessary to have a man present who knows what he is after and what he is about. That man should devise the general methods of analysis, so that the detail work may be done by a clerk or inexpensive assistant who will lay the results before his chief, for comparison with the ideal; the chief will follow up differences in whatever way suggests itself as best; that best may be a further subdivision in analysis, or it may be sufficient to go to the shop and find the trouble by a talk with the foreman; detail methods will vary with every man and every foundry.

Messrs. Taylor and Gantt have done much in cost reduction. They have taken certain work and resolved that into the time taken for practically each move made; at first sight a good deal of this sounds ridiculous; but Mr. Taylor was able to cut costs enormously to amounts that were considered totally impossible. Personally I have never applied Mr. Taylor's principles at their extreme, but I can see their wide availability. In the drilling of a novice to careful analysis no doubt the time required is a very serious element; but the trouble and cost will be repaid by the increase of output. All analysis must be made in accordance with the interest of the work in hand and not, as is often the case, simply for its own sake. The thing to be avoided is to have a great deal of work carried along in the head of some one man, and therefore dependent upon his personality. As quickly as possible everything should be brought down to a basis where it will permit of impersonal study and avoid dependence upon any particular individual; there will always be a field for the resourceful and forceful man without burdening him with duties that merely take up time that he could devote to work that cannot be delegated to others.

E. H. Mumford.—I want to add my word of praise for this paper. I remember that there was a paper read before the Mechanical Engineers' Society some years since on foundry costs, in which the molders' pay-roll was made a basis of estimate and a ratio to fixed charges established with that as a factor. I think the paper (I have forgotten exactly how it went)—I think it advocated taking a previous year's experience of the ratio to fixed charges of the molders' pay-roll as a basis of estimate for the current year's business. A mere contrast with the very broad conception of such a scheme as this of the very nicely detail conception of Mr. Hess's, shows how much closer he is getting to the real question. It seems to me that to handle the subject of costs in the full detail that Mr. Hess does shows us the difficulty of this problem of estimating foundry costs. Instead of attempting to establish any broad ratio, Mr. Hess studies each detail by itself. Probably in the same way the thoroughly experienced and competent foundry foreman gets at the subject. He has in his head, from his long experience, each detail that Mr. Hess, for the benefit of all of us, has put on paper, so that he can apply to his particular work, without thinking very much about it, the various curves which he has in his head and get at the result which anybody not so equipped could not get at; and it seems to me that Mr. Hess's paper will furnish a good many of us with tools to use in estimating foundry costs. I remember, when I had charge of a large foundry, receiving a letter from a New York club, from the proprietor of the foundry, saying he thought I had too many non-producers, reminding me that the only man in the foundry who made money for his employer was the molder. He had discovered that I had two carpenters, and wanted to know what a carpenter had to do with an iron foundry. It is quite easy to suppose carpenters are important items of expense if a casting, say, of a large bed plate, is to be bedded in the floor. Even the lumber used would come into play and perhaps the teamsters' union. The practical estimator would take those things into account at sight, but the very first week of an experience of that sort would show a discrepancy from Mr. Hess's curves, which would then be looked up and traced to the making of big wooden cope flasks. It seems to me that Mr. Hess's paper is valuable in pointing out the enormous rambling detail of foundry expenses, and the easy way he has found for systematically keeping track of them.

Mr. Hess.—I may say that I was forced into this idea of analyzing costs on the basis of variation in output. At the time I had under my charge a rather large establishment—the German Niles Tool Works, of Berlin, Germany—and unfortunately by the time we were ready to put our product on the market the bottom had dropped out of business generally. In attendance on the decreasing output our costs were going up continually; every foreman and sub-foreman placed the blame on the outputs going down all the time. We all know that is a good excuse; but the costs were increasing faster than seemed to me justified by the decrease in output. In laying down my "ideal curves," I called in the so-called "foundry engineer" (in Germany every man must have a title, and his was "foundry engineer"). At the end of the very next period the costs were found to have decreased in despite of a decreased output, and that without having carried through the analysis in detail of any one item. The mere fact that there was a figure based on output to which the "foundry engineer" would be strictly held,—and not only he, but all others,—operated to have all costs and times checked much more closely and to bring about a reduction of total costs; so that an arrangement of this sort has a twofold value—that of so fixing and locating responsibility that each man knows there is no crawling out of it, and then after that element of irresponsibility is eliminated, of showing just where advantageous changes should and can be brought about

MID-YEAR SHUT-DOWNS OF MILLS.

(Special Telegram.)

PITTSBURG, Pa., June 29.—The Amalgamated Association wage committee is conferring with independent sheet manufacturers at the Hotel Lincoln again today. No agreement was reached at yesterday's conference, when the independent sheet manufacturers asked 20 percent reduction from last year's scale, which would mean an additional 2 percent below the existing scale, agreed upon at the April conference. There is no probability of the Amalgamated Association agreeing to this proposal. Neither the American Sheet & Tin Plate Co. nor the independents are willing to take the initiative in signing the scale for the ensuing year from July 1. The largest producer fears that if it sign the scale before the independents the latter will break away from the Amalgamated Association, while the independents are not anxious to sign before the American Sheet & Tin Plate Co. The latter and the Amalgamated Association have agreed to an 18 percent reduction, or a continuation of the present scale, with a few changes in the foot notes, but the independent manufacturers are opposed to making any foot note changes. The latter argue that they cannot compete with the non-union mills of the American Sheet & Tin Plate Co., and therefore should receive greater concessions than are given the latter.

Another conference is to be held with officials of the American Sheet & Tin Plate Co. as soon as the conference with the independents is at an end. From present indications the closing down of all union sheet and tin plate mills at midnight tomorrow, when the present scale expires, is a certainty.

Officials of the American Sheet & Tin Plate Co. are conferring with the wage committee of the tin house workers on the 1904-05 scale, the present scale expiring July 15. The company demands a reduction of 10 percent. As yet no agreement has been reached.

It cannot be learned definitely whether the Carnegie Steel Co. will close down the mills of the American Steel Hoop Co. at midnight tomorrow. The iron scale has not yet been arranged for and the Carnegie Steel Co. has not signified its intention of accepting the continuous operation arrangement. The circular letter to all manufacturers sent out by the Amalgamated Association this week has not yet been answered by the Carnegie company and indications are that all mills in this district and at Youngstown will be closed. The Republic Iron & Steel Co. has accepted the continuous arrangement, by which operations can be continued until the scale is settled by a board of arbitration of three members. While a complete shut-down has not been decided on, one mill at Youngstown and a number of other plants will be closed and when repairs are completed these mills will resume and others shut down.

The National Tube Co. will shut down a few of its departments tomorrow night for much needed repairs and all will resume on July 11. For the past three or four years all plants of this concern have operated at full capacity and repairs are much needed at many plants. The company is well filled with orders and continuous operation through the last half of the year is already assured for nearly all departments.

The Proposed European Rail Syndicate.

Some attention has been devoted in the daily newspapers to a proposal for the establishment of a syndicate of rail manufacturers, or, at any rate, of an agreement as to production and prices among those engaged in this branch of industry in Great Britain, Germany, and Belgium. Such an agreement has been talked of for a long time—indeed, almost ever since the previous Rail Manufacturers' Association of twenty years ago was dissolved—but the difficulties in the way of reviving such an organization have hitherto proved insuperable, and the matter has not so far gone beyond mere talk, or paper proposals. Under the previous arrangement, Germany and Belgium were included, and it was the opinion of some at least of the most prominent British manufacturers that those countries had more than their fair share of the orders distributed under the association agreement. Moreover, there were dissensions among British firms, as such, and although the association contrived to keep alive for several years, it was with the utmost difficulty that this was done. There is not now such a radical change in the principles or details involved in such an arrangement as to justify the expectation that the troubles and sources of discord of twenty years ago have been eliminated. On the contrary, the competitive capacity of the United States, which was then a negligible quantity, has now, in some respects, become the controlling factor, and until that has been reckoned with all idea of successful action in respect of either production or price, must, from an international point of view, be abandoned. As matters stand, British rail manufacturers, as such, now exercise considerable control over both home and Colonial rail orders.—[London Iron and Coal Trade Review.

First Steel at Gadsden, Ala.

The first heat in the open-hearth department of the Alabama Steel & Wire Co., at Gadsden, Ala., was made on June 24, and the operation was entirely successful. The quality was exactly that required for the company's rod mill at Ensley and the output was 100,000 pounds. The company has now completed the cycle of operations involved in carrying through its own ore and coal to barbed wire and nails. The new open-hearth furnaces have been most satisfactory thus far, particularly in quickness and certainty.

Southern Pig Iron Freight Rate.

(Special Telegram.)

CINCINNATI, June 29.—The L. & N. road announces that it will continue the present pig iron freight rate to Chicago, $3.65 from Birmingham, after July 1, while restoring the old rate to all other points receiving the 15 or 20-cent reduction six weeks ago. Lines north of the Ohio have agreed to restore all rates on July 1, and the action of the L. & N. unsettles the situation.

Cleveland-Cliffs Iron Co.'s Operations.

A pamphlet has been prepared by the Cleveland-Cliffs Iron Co., of Cleveland, O., and Ishpeming, Mich., explaining the model of the charcoal furnace and chemical plant of its allied company, the Pioneer Iron Co., of Marquette, Mich., as shown at the St. Louis Exposition. Following a detailed description of the construction of the Marquette plant, there is given this resume of the operations of the Cleveland-Cliffs Iron Co., Pioneer Iron Co. and their allied interests:

Iron ore mined in 1903 (gross tons)	1,649,567
Total mined up to 1903 (about)	18,000,000
Charcoal pig iron made in 1903	81,444
Charcoal pig iron made 1854-1903 (about)	721,000
Wood alcohol made in 1903 (gallons)	446,423
Acetate of lime made in 1903 (net tons)	3,000
Miles of standard gauge railroad operated	228
Tons carried in 1903 on railroad operated	2,212,219
Ships owned, steam and sail	8
Gross tons freight carried	481,392
Average men employed 1903	3,500
Average wages at mine, per day	$2.21
Average wages paid on vessels	2.23
Average wages at furnaces	2.20
Acres of land owned and controlled	1,400,000

All of the iron ores and the wood used by the Pioneer Iron Co. are furnished from the mines and lands of the Cleveland-Cliffs Iron Co. and over railroads owned or controlled by the same interests.

The W. H. Griffiths Co., Washington, Pa., in order to increase its output of charcoal iron roofing plates, has decided to instal a complete forge and bar mill equipment at its Waynesburg, Pa., plant, which will be a duplicate of this department at Washington. The company announces that after Sept. 1 it can offer not only Griffiths brands of genuine roofing plates, but also charcoal iron, black and galvanized sheets made from knobbled and unhammered stock in gauges 16 and lighter, 36 inches wide and narrower and 120 inches long and shorter.

Furnace G of the Edgar Thomson plant of the Carnegie Steel Co., Braddock, Pa., has been banked. There are now two idle stacks at this plant.

MERCHANT MARINE COMMISSION.

A sub-committee of the Congressional Merchant Marine Commission held meetings last Friday and Saturday in Chicago, Monday of this week in Detroit, and Tuesday and Wednesday in Cleveland. The members of the committee are: Senators Penrose, of Pennsylvania, and Gallinger, of New Hampshire; Congressmen Grosvenor, of Ohio; Humphrey, of Washington; Minor, of Wisconsin; and Spight, of Mississippi. At the Chicago meeting W. L. Brown, president of the American Shipbuilding Co., spoke of the remarkable growth of the lake marine, and said that it needed no protection. He said that it had been proved that a 10,000-ton ship could be operated as cheaply as one carrying 6,000 tons.

At Detroit, President Livingstone, of the Lake Carriers' Association, addressed the commission at length, giving much valuable information on the cost of labor in ship yards of the lakes and at the yards where foreign-going ships are built. Antonio C. Pessano, president of the Great Lakes Engineering Works, advocated a great waterway connecting the lakes to the Atlantic coast. He said that he really favored a subsidy, but feared it could not be passed by Congress and therefore had become favorable to the plan of differential duties as a compromise.

Among the members of the committee on reception in Cleveland were H. G. Dalton, of Pickands, Mather & Co.; L. C. Hanna, of M. A. Hanna & Co.; W. G. Mather, president of the Cleveland-Cliffs Iron Co.; E. W. Oglebay, of Oglebay, Norton & Co.; and C. H. Wellman, of the Wellman-Seaver-Morgan Co. Among those who spoke in Cleveland was James C. Wallace, vice president of the American Shipbuilding Co., who stated that he had been informed that steel plates had been delivered at Belfast, Ireland, for $24 a ton, while the same steel cost American manufacturers $32. Others who addressed the meeting in Cleveland were A. S. Upson, president of the Upson Nut Co.; James Craig, of the Craig Shipbuilding Co., of Toledo; Captain A. B. Wolvin, of Duluth; W. D. Sayle, president of the Cleveland Punch & Shear Works Co.; and Alexander E. Brown, vice president of the Brown Hoisting Machinery Co.

The commission adjourned on June 29 until July 15, at which time it will visit Milwaukee and other cities in the Northwest, working its way west to San Francisco. Another sub-committee is holding hearings in cities in the Gulf States.

Various Shut-downs of Western Works.

(Special Telegram.)

Chicago, June 29.—The Illinois Steel Co. shut down its rod mill department at Joliet this week and is contemplating further suspensions in other departments at these works within the near future. It is expected that the rod mills will remain idle for several weeks at least. The Inland Steel Company will shut down its entire plant at Indiana Harbor on June 30, for the purpose of making repairs and pending the signing of the new wage scale. This plant will not be started up within two weeks and may be idle for a longer period. The Republic Iron & Steel Co. says that its rolling mills will close down the end of this month as is customary for the purpose of taking the annual inventory. No definite date has been set as to when operations will be resumed, as it is not known, though the officials say it is expected the mills will be running again in a few weeks.

La Belle Iron Works Officers.

(Special Telegram.)

Pittsburg, June 29.—At a meeting of the board of directors of the La Belle Iron Works, Steubenville, O., held yesterday, the resignation of John A. Topping as president was accepted. Isaac N. Scott, first vice president, was elected his successor by unanimous vote. On Aug. 1 Mr. Topping becomes president of the American Sheet & Tin Plate Co., succeeding President Graham. Mr. Kirk was elected treasurer and George Greer, of New Castle, was elected a director to fill Mr. Topping's place on the board. The office of vice president was left vacant. President Scott began his career with the Aetna-Standard Iron & Steel Co. at Bridgeport. Later he went to Beaver, Pa., as secretary of the Beaver Tin Plate Co., in which W. T. Graham and others were interested. On the organization of the American Sheet Steel Co. he was elected auditor, and when Mr. Topping left the sheet steel company to take the presidency of the LaBelle Iron Works. Mr. Scott went to the same concern as first vice president. A new office was also created at yesterday's meeting, that of chairman of the board of directors, to which A. K. Clarke was elected.

South Sharon Furnace Blown Out.

(Special Telegram.)

Pittsburg, June 29.—Blast furnace No 1, at South Sharon of the Carnegie Steel Co., was blown out today for repairs and relining. The No. 2 new stack at this plant is not yet active, although indications are that it will be blown in in the near future. It was erroneously reported last week that the Shenango Steel Works were idle. This plant is on in full and no date has been fixed for a shut down. New stack No. 3 of the Carnegie Steel Co. at New Castle, 500 tons capacity, will be ready for operation July 1. The new No. 2 stack will not be completed until September.

An international combination publication, in London, of the *Railroad Gazette*, of New York, together with the *Transport*, of London, will begin in the first week in July. As preliminary to this arrangement, which involves the republication in the British edition of nearly all the pages of the *Railroad Gazette*, the latter has cut down its page, which has long been folio size, to one of 9¾ x 13 inches.

F. H. Clergue has announced that he will erect a large coke plant at the Michigan Soo. He has applied for a gas franchise and expects to supply the city with gas from the coke plant.

Concerning the report that the Lackawanna Steel Co. would join the structural pool, an official of the company has been quoted as saying: "We will be perfectly satisfied to remain as we are. We will be willing to co-operate with other companies when the advantage will be mutual, but we will not enter into any uniform agreement."

The Cincinnati Milling Machine Co. received the order of The Canadian-Westinghouse Electric & Mfg. Co., Hamilton, Ont., for eleven milling machines and two cutter grinders. This is the largest single order for milling machines that has been placed for some time.

The S. Obermayer Co., with general foundry supply offices in Cincinnati, announce that its Detroit office has been closed temporarily and that communications may be addressed to the Cincinnati or Chicago offices.

A meeting of chain manufacturers was held at Pittsburg June 28 and the 12½ percent reduction made on Jan. 1 was discontinued, the schedule at the close of 1903 being restored.

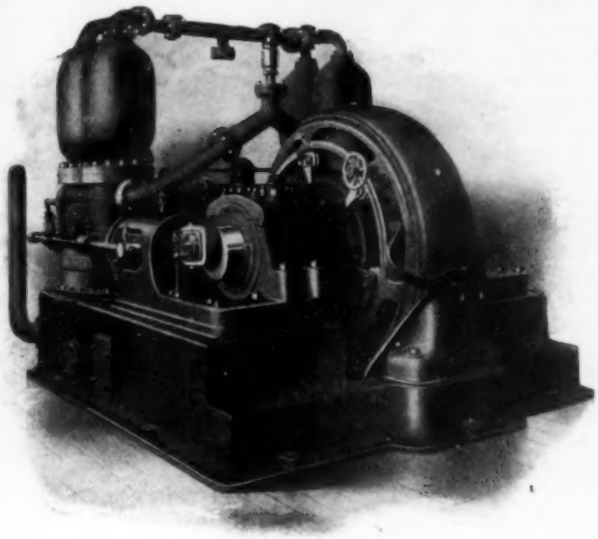
Disaffection is again found in the ranks of the sheet workers of the Amalgamated Association. A convention was held at Cincinnati this week, attended by delegates from four sheet plants in that district, at which steps were taken to form an independent sheet workers' organization. All told delegates were present from four plants having 27 mills as follows: American Rolling Mill Co., Middletown, O.; Newport Rolling Mill Co., Newport, Ky.; Licking Rolling Mill Co., Covington, Ky.; and the Ashland Sheet Mill Co., Ashland, Ky.

The strike of the boiler makers and helpers of the Illinois Central railroad, which was repudiated by the president of the National Boiler Makers' Union, has been ended. The men will return to work under the old conditions.

The international strike of the elevator constructors against the Otis Elevator Co., called on June 17, has been abandoned by the executive committee of the union. Telegrams were sent June 28 to all the cities affected, directing the strikers to return to work.

A HIGH SPEED MOTOR-DRIVEN PUMP.

The operation of pumping machinery by electric motors, especially in mines, has obvious advantages in the centralization of power plant, elasticity of extension of the system, high efficiency and small first cost and small expense for attendance. But electric-driven pumps have had one drawback, which, though not serious, has had to be taken into account. This was the necessity of toothed gearing, belts or other devices to transfer the power from the rapidly revolving motor shaft to the slow moving crank shaft of the pump. Such devices added to the weight and size of the pumping unit and required either careful attention or frequent repairs. The use of toothed gearing on pumps in buildings is, moreover, objectionable on account of noise.



BLAKE & KNOWLES HIGH SPEED MOTOR-DRIVEN PUMP.

In the pump shown herewith tese objections have been eliminated by connected the pump plungers to cranks mounted directly upon the shaft of the motor. This pump has a capacity of about 250 gallons per minute against 1,000 ft. head wen running at a speed of about 300 revolutions. Its mechanical efficiency is over 93 percent, approximating closely that of the highest types of large steam pumping engines. The pump is of the duplex type, the cranks at the opposite ends of the motor shaft being set at right angles to each other. The plungers are of the outside-packed pattern and the two plungers of each pump are connected by side rods. The plungers are 3½ inches in diameter and nave a stroke of 5½ inches. In a carefully conducted test, the particulars of which are given in the accompanying table, the volume of water pumped was measured by means of a calibrated Freeman nozzle and all gauges were tested before and after the test by means of a weight gauge tester. The pressure at the nozzle was measured by a mercury column connected to a piezometer chamber.

The pump and motor are mounted upon a rigid box-girder frame, and the unit is self-contained and occupies a relatively small space. It contains many novel features of construction and the most careful attention has been given to the design of the internal parts, as well as to the running parts and oiling devices. High speed pumps have been constructed heretofore with mechanically operated valves, but have proved far from satisfactory, and in many cases the entire valve mechanism has been removed with beneficial results. Some designers advocate closing mechanically both inlet and outlet valves, while others favor mechanically opened valves; again, some constructors operate one set of valves mechanically.

This type of pump, which has lately been introduced, is built by the Blake & Knowles Steam Pump Works, of 114 Liberty street, New York City, in capacities of from 200 to 4,000 gallons per minute, and for heads varying from 100 to 2,000 feet. One of these pumps, operated by a direct-current motor, will be exhibited in the space of the General Electric Co. at the St. Louis Exposition.

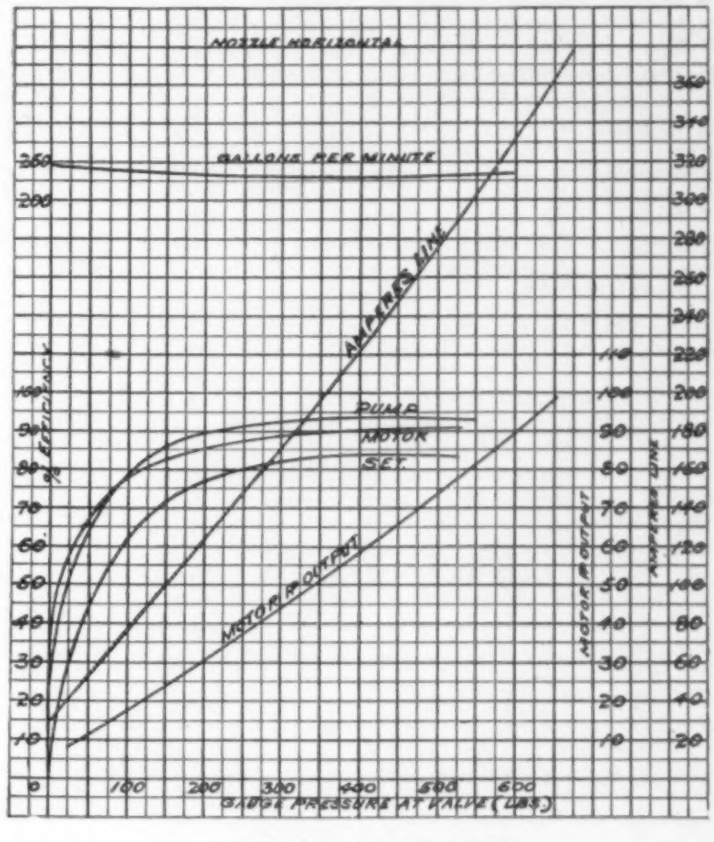
TEST OF A BLAKE-KNOWLES HIGH-SPEED PUMP.

Revolutions per Minute	Motor Input Watts	Pump			Efficiencies Per cent.		
		Gallo's Deliv'd	Pressure Lbs.	Pump H. P.	Motor and Pump	Motor alone	Pump alone
280	28,800	237	110	32.63	78.	86.5	90.1
280	40,600	237	215	48.94	82.2	89.	92.36
280	52,550	236	321	62.25	84.4	90.1	93.66
280	60,200	234	425	74.53	84.3	90.9	92.74
300	58,800	262	496	71.79	83.3	.....	.....

The Mackie Steel Tube Works, Hammond, Ind., have been sold for $2,750, to Gostlin, Meyn & Co., who will retain possession of the property until they can obtain some manufacturer to occupy it.

The American Locomotive Co. has declared the regular quarterly dividend of 1¾ percent on preferred stock, payable July 21.

The Brooklyn Foundry Co., Brooklyn, N. Y., recently incorporated, takes over the foundry and pattern works of Andrew N. Petersen, at 372-392 Greenpoint avenue, Brooklyn. Mr. Petersen started twelve years ago in the pattern business in a very modest manner. He soon had the largest pattern business in Brooklyn. He then established a foundry, which was burned in a short time. He at once obtained a large building and installed modern foundry equipment. Some time ago he decided to incorporate his business and conduct it on a co-operative plan. He presented a considerable amount of stock to his employes and told them they would have the privilege of increasing their holdings at their own discretion.



TEST OF BLAKE & KNOWLES PUMP.

EARLY USE OF 60,000-POUND STEEL.*

BY SAMUEL TOBIAS WAGNER.

The growing favor with which the proposition to use a single grade of steel for all ordinary structures, and that grade having an average ultimate tensile strength of 60,000 pounds per square inch is the excuse for the presentation of this paper which is not intended to present any new facts, but simply, in a brief manner, to attempt to follow the earliest uses of structural steel in this country and specially to review the attempts to produce a 60,000-pound steel over 20 years ago. Mr. C. C. Schneider presented to this society a review of the history of the use of steel as applied to bridges in this country, at the meeting at Atlantic City in 1902, and the writer takes the liberty of using it, and at the same time inserting a number of additional structures which were erected between 1878 and 1884. The additions consist of the following bridges: Glasgow, Chicago River, Smithfield street at Pittsburg, Blair, Williamette, Point Pleasant, and Henderson.

Year	River	Description	Ultimate strength	Min. Elong. %
1874	Mississippi	Arches, St. Louis	100,000 min.	18
1878	.....	Glasgow Bridge	80,000 to 100,000	10 to 15
1878	Chicago	Chicago River	.....	.....
1880	Missouri	Plattsmouth	80,000 min.	12
1881	Monongahela	Smithfield St.	C. 80,000 to 90,000	12
			T. 70,000 to 80,000	18
1882	Missouri	Bismarck	C. 80,000 to 90,000	12
			T. 70,000 to 80,000	18
1882	East River	Brooklyn Bridge	70,000	.....
1883	Niagara	Cantilever	80,000	15
1883	Missouri	Blair	C. 80,000	15
			T. 70,000	18
1883	.....	Williamette	.....	.....
1883	Ohio	Point Pleasant	.....	.....
1884	Ohio	Henderson	.....	.....
1884	Susquehanna	B. & O. R. R	C. 80,000	15
			T. 70,000	18
1885	Arkansas	Van Buren	C. 80,000	15
			T. 70,000	18
1885	Ohio	Ken. & Ind. Cent.	C. 80,000	15
			T. 70,000	18
1886	Harlem	Washington Arch, N. Y.	62,000 to 70,000	18
1887	Missouri	Sibley, A. T. & S. F.	C. 75,000 to 85,000	18
			T. 60,000 to 70,000	23
1888	Missouri	Omaha	C. 80,000	15
			T. 70,000	18
1888	Mississippi	Cairo	67,000 to 75,000	20
1888	Ohio	Cincinnati, C. & O.	C. 64,000 to 72,000	19-17
			T. 58,500 to 66,500	20-18
1890	Firth of Forth.	Cantilever	C. 76,000 to 83,000	17
			T. 67,000 to 74,000	20
1890	Colorado	Red Rock Cantilever	C. 64,000 to 72,000	19-17
			T. 58,500 to 66,500	20-18
1890	Mississippi	Merchants Br., St. Louis	67,000 to 75,000	20
1891	Ohio	Cincinnati Cantilever	62,000 to 70,000	22
1892	Mississippi	Memphis Cantilever	Main truss 69,000 to 78,500	18
			Rest 64,000 to 72,500	22
1898	Mississippi	Bellefontaine	62,000 to 70,000	22
1893	Delaware	P. R. R. Phil.	Main Truss 62,000 to 70,000	22
			The rest 50,000 to 60,000	26
1897	Niagara	Double deck bridge	60,000 to 68,000	20
1898	Niagara	Highway arch	60,000 to 68,000	20

C represents compression.
T. represents tension.

Where details are not supplied it has not been possible to obtain them. Steel for the bridges at Point Pleasant and Henderson was made by the Cambria Iron Co., whose records were lost in the flood of 1888.

The best obtainable data show that up to about 1886 it was customary to use a steel of much higher tensile strength than that which can now be considered good practice for ordinary structures. This seems to have naturally occurred, on account of the desire of engineers to use a high unit stress for a high ultimate, irrespective of the danger of non-uniformity and the liability to injury of such material under mill and shop treatment. Now that we can look back to it, it seems natural that such should have been the case. It would seem that as early as 1884 very little was known of what we now call a 60,000-pound steel.

The writer has been interested in noting of late that his first practical experience with steel was with what was then called soft or mild steel, and that it was probably the beginning of the use of 60,000-pound steel in the United States for structural purposes. In 1883, while in the employ of the Phœnix Iron Co., of Philadelphia, he was assigned to represent that company in the tests which were made by the United States navy upon steel shapes for the U. S. dispatch boat Dolphin and the cruisers Boston, Atlanta, and Chicago, constructed under acts of Congress of Aug. 5, 1882, and March 3, 1883, and built under contract with Mr. John Roach, of the Delaware Iron Shipbuilding & Engine Works, of Chester, Pa.

*Presented to the American Society for Testing Materials. Atlantic City Meeting, June, 1904.

The history of the reason why mild steel was used for these vessels is interesting, and the specifications and details in obtaining it form the principal excuse for the presentation of the data which are drawn from the private notes of the writer and from a "Report of the Naval Advisory Board on the Mild Steel Used in the Construction of the Hulls, Boilers and Machinery of the Dolphin, Atlanta, Boston and Chicago. Prepared from the records of the Board by Assistant Naval Constructor R. Gatewood, U. S. N."

The advisory board above referred to was convened by the Secretary of the Navy on June 29, 1881, to suggest the number and class of vessels needed by the navy, and in their report to the Department it was divided upon the question whether the vessels should be constructed of iron or steel, the majority favoring steel. Abstracts from their report are as follows:

They admitted that the most difficult question to decide was the proper material to be used. The contention was made that the construction of iron vessels had reached a very satisfactory condition and that steel would cost more, and in view of the experimental stage which shipbuilding was passing through at that time in Europe it would not be wise to use it. The reasons for its use were:

1. Increased saving in weight of hull by reduced dimensions
2. Increased strength of hull and immunity from danger in grounding.
3. Rapidly increasing success with steel in Europe.
4. The certainty that steel will supplant iron in the near future.
5. The impetus to the general development of steel in the United States by such a step of the Government.
6. The necessity that when vessels should be completed, they should be equal if not superior to vessels in their class abroad.

Upon this report coming before the Naval Committee of the House, an exhaustive investigation in committee was made, and resulted in a report favoring the use of mild steel with but one dissenting vote. Among the reasons given in favor of it were:

1. That the quality of the steel required could be produced in this country in sufficient quantity and at a reasonble cost.
2. The committee was surprised and gratified to learn that the United States at that time was the second country in the world, if not the first, in the manufacture of steel. That specimens of open-hearth steel (which is the best for shipbuilding purposes, as the evidence clearly shows) from several of the largest manufactories in the country, were presented to the committee. This steel is uniform in character, has a tensile strength of from 55,000 to 63,000 pounds per sq. in., and a ductility of 30 percent. It is capable of being folded under heavy hammers without crack or fracture.

The act of Aug. 5, 1882, contains the following provision as to material: "Such vessels . . . to be constructed of steel of domestic manufacture, having as near as may be a tensile strength of not less than 60,000 pounds to the sq. in., and a ductility of not less than 25 percentum."

After the contracts were made instructions were sent to all the navy inspectors, from which the following extracts are made as representing the best naval practice at that time.

SHIP PLATES.

The test pieces to be submitted to a direct tensile stress until they break, and in a machine of approved character.

The initial stress to be as near the elastic limit as possible; which limit is to be carefully determined by the inspector in a special series of tests. The first load to be kept in continuous action for five minutes. Additional loads to be then added at intervals of time as nearly as possible equal, and separated by half a minute; the loads to produce a strain of 5,000 of original section of the test piece until the stress is about 50,000 pounds per sq. in. of original section, when the additional loads should be in increments not exceeding 1,000 pounds.

CONDITIONS OF ACCEPTANCE.

In order to be accepted the average of the four test pieces must show an average tensile strength of at least 60,000 pounds per sq. in. of original section, and a final elongation in 8 inches of not less than 23 percent. If any single piece shows a tensile strength of less than 58,000 pounds, or a final elongation of less than 21 percent, the piece from which it was cut shall be rejected and the test considered to have failed, regardless of its average. Lots of material which show a greater strength than 60,000 pounds per sq. in. will be accepted, provided the ductility remains at least 23 percent.

It is interesting to note here that when the specifications were issued by the Navy Department a modification was made in the prescribed requirement for the elongation. It was reduced from 25 to 23 percent in 8 inches. The reasons given for this change were, that at that time the most severe tests required abroad for similar material were by the French Navy, where an elongation of 20 percent in 200 millimeters (8 inches equals 203.2 millimeters). It had further been the boast of the American manufacturers that their iron was superior to that in general use in Europe, and that American Steel deserved the same reputation. The table hereafter given shows that the average elongation obtained was 25.52 percent, but at that time the ductility was one of the most troublesome elements to meet and caused the greatest number of rejections.

QUENCHING TEST.

A test piece shall be cut from each plate, angle or beam, and after heating to a cherry red, plunged in water at a temperature of 82 degrees Fahrenheit. Thus prepared it must be possible to bend the piece under a press or hammer so that they shall be doubled round a curve of which the diameter is not more than one and one-half times the thickness of the plates tested without presenting any trace of cracking.

These test pieces must not have their sheared edges rounded off, the only treatment permitted being taking off the sharpness of the edges with a fine file.

ANGLES, BEAMS, BULB BARS, T-BARS, ETC.

In every lot of twenty angles or beams, etc., test pieces to be cut from the webs of two taken at random, one from each. These pieces to be fashioned in the same way and to be subjected to the same tests, both tensile and quenching, and to fulfil the same requirements for acceptance as already prescribed for ship plates.

Angle bars to be subjected to the following additional tests: A piece cut from one bar in 20, to be opened out flat while cold, under the hammer; a piece cut from another bar in the same lot shall be closed until the two sides touch, while cold; a piece from a third bar of the lot shall be bent cold into a ring, so that one of the sides of the angle bar shall be kept flat and the other side forming a cylinder of which the internal diameter shall be equal to one and one-half times the breadth of the side which remains flat. The angle bars submitted to thes tests must show neither cracks, clefts, nor flaws.

Single "T" bars to be submitted to the following tests: A piece to be cut from the end of a bar taken at random from each lot of 20, and to be bent cold into a half ring, so that, the web remaining in its own plane, the cross flanges shall form a half cylinder, of which the internal diameter shall equal four times the height of the web of the "T" bar.

At the end of another bar of the same lot the web to be split down its middle for a length equal three times its total depth, and a hole drilled at the end of the slit to prevent it spreading; the piece thus split to be opened out in its own plane, so as to make an angle of 45 degrees with the rest, care to be taken that the part opened shall be kept straight, except that it must be joined to the rest of the bar by a bend of small radius.

Bulb bars are to be submitted to the same tests as those prescribed for "T" bars, except that, in bending, one or more heats may be used.

All bars submitted to these tests must show neither cracks, clifts or flaws.

RIVETS.

From every lot of 500 pounds four rivets are to be taken at random and submitted to the following tests, one rivet to be used for each test: First, a rivet to be flattened out cold under the hammer to a thickness of one-half its diameter without showing cracks or flaws; second, a rivet to be flattened out hot under the hammer to a thickness of one-third of its diameter without showing cracks or flaws; third, a rivet to be bent cold into the form of a hook with parallel sides without showing cracks or flaws; fourth, a rivet to be tested by shearing by riveting it up to two pieces of steel, which are to be submitted to a tensile strain, the rivet not to shear under a stress of less than 50,000 pounds per square inch.

The Chester Rolling Mills, of Chester, Pa., the Norway Iron & Steel Co., of South Boston, Mass., and Park Bros. & Co., of Pittsburg, Pa., made the ship and boiler plates; the Phœnix Iron Co., of Phœnixville, the angles, tees and deck beams. Assistant Naval Constructor R. Gatewood and Assistant Engineer B. C. Bryan were assigned to the work at Phœnixville. At that time the Phœnix Iron Co. had no steel mill, and a lot of blooms of Bessemer and open-hearth steel were ordered as an experiment from the Pennsylvania Steel Co., of Steelton, Pa., and the Cambria Iron Co., of Johnstown, Pa. These were rolled into various shapes at Phœnixville and were tested by the writer in accordance with the naval requirements. As a result of these tests, combined with what knowledge existed at that time regarding the relative merits of Bessemer and open hearth steel, a contract was entered into with the Cambria Iron Co. to supply the blooms for the shapes required, of open hearth steel, and the writer was sent to Johnstown to accept the blooms from the Cambria Iron Co. At this time the filling of an order of steel to meet these requirements was looked upon as something of an undertaking, as very little material with such low carbon and such high ductility had been manufactured for any important structures.

The steel was made in two 15-ton Pernot revolving furnaces, with 16-foot pans, erected in 1878-79. Ferro-manganese was added before tapping, and the bath was rabbled while the furnace revolved. The ingots were top cast and weighed about 5,500 pounds each. One ingot was rolled in the blooming mill as soon as possible and two test billets removed, which were hammered down to slabs about three inches thick, reheated and rolled into 6 inch by 7-16 thick flats, from which the tensile tests were cut. The other ingots were allowed to cool off completely, awaiting the results of the tests, when, if satisfactory, they were rolled into blooms of ordered sizes. A quenching test was made at the same time.

Considerable difficulty was experienced at first in making the steel. In the first 20 heats made 11 were rejected, mainly on account of failure to show the required elongation, and some few failing to pass the quenching test.

Part of the trouble was also caused, in the mind of the writer, on account of the fact that when not making this soft steel the furnaces were making very high carbon steel for springs and agricultural purposes, and on changing from this grade were very apt to miss the next heat or two. This trouble was, however, overcome in a short time, when heat after heat was satisfactorily made. Large flaws in the blooms were chipped hot in the blooming mill, and it was the practice for some time to carefully examine each bloom, when cold, and chip the flaws down to solid metal.

The acceptance of the quality of the blooms on the above tests was difficult because the blooms were rolled at Phœnixville into all kinds of sizes from heavy deck beams to very light angles, and in these shapes were again tested and finally passed upon by the Government inspector. This method was afterwards changed, a Government inspector being sent to Johnstown to accept the steel from the Cambria Iron Co. At Phœnixville some trouble was experienced at first in the rolling mills because the heating of steel was new to the heaters, and in a few cases at first some of the blooms were overheated. These bars were generally discovered when the quenching tests were made.

The method of making the tests, as before noted, was very peculiar, and in these later days of expeditious working would have been looked upon as disastrous. The average time consumed in making 20 tests taken at random was 20 minutes each. Later on the time of the application of the first load was reduced from five minutes to one minute. Taking everything into account on these tensile tests, it was impossible to break more than 20 pieces in a day. The following table shows the average results of the more important elements of the steel from the shapes:

	Accepted Material	Rejected for lack of elong.	Rejected for low ult.	Rejected quenching test
Number of heats	114	10	6	3
Number of tests	483	21	23	12
Average carbon per cent.	.160	.162	.153	.166
Average Elastic limit	41,440	44,133	36,796	39,153
Average ult. strength	64,057	65,871	58,284	62,640
Average Elong. 8 in	25.42	21.91	27.11	26.02

At first the division for acceptance under the specifications was a lot of 20 pieces, from which were made:

On all shapes:
- 2 tensile tests,
- 20 quenching tests.

On angles:
- 1 open test,
- 1 closed test,
- 1 bent ring test.

On tees:
- 1 ring test,
- 1 split bending test.

On decks and bulbs:
- 1 split bending test.

On account of the unavoidable confusion existing by reason

of the unit of acceptance being a lot of material which might contain a number of heats, the unit was changed to a heat, the same number of tests being prescribed. After the year 1886 the use of softer grades of structural steel increased slowly, as will be evident from an examination of Mr. Schneider's table, but it seems evident or likely that the effort of the Government to obtain a low carbon steel with high ductility in 1883 was a very courageous attempt, as there was no precedent for material of that grade in the United States at that time.

Several of the reasons given in the report of the committee of the House for its use in these vessels seem to have materialized, notably: First, the impetus which such use gave to the steel industry specially in the introduction of and use of low carbon steels for structural purposes. Second, the fact that iron in the near future would be replaced by steel, as twelve years afterwards, in 1893, the Carnegie Steel Co., in the preface to their pocket book, said: "The feature of this edition is the elimination of all data relative to iron sections. Our product hereafter will be exclusively steel."

Looking back over the whole field it seems fair to say that the effort to obtain what is now likely to be regarded as a standard structural steel for ordinary purposes, was first attempted by the Government for use in the first steel vessels of our modern navy.

Iron Trade Conditions in Germany.

The production of pig iron in Germany for the first four months of the present year was 3,295,151 tons, which compares with 3,215,474 tons for the first four months of the previous year, despite the general tendency of the iron trade to greater depression. The production of basic iron increased from 1,954,136 tons to 2,071,832 tons, of Bessemer from 129,189 tons to 161,122 tons and of foundry from 582,933 tons to 584,571 tons. In spiegel there was a falling off from 258,313 tons to 195,452 tons and in forge iron from 290,903 tons to 282,174 tons.

So far this year there has been a noticeable falling off in the exportation of steel rails from Germany, the returns for the four months ending with April last showing a total of only 52,618 tons, as contrasted with 106,195 tons in the corresponding period of 1903.

Imports of 175,474 tons of foreign coke into Germany were made during the four months ending with April, as compared with 134,647 tons in the corresponding period last year. There has also been an increase in the exports of German coke from 817,760 tons in the first four months of 1903 to 905,800 tons in the four months ending with April last.

Very large contracts for Swedish iron ore for Germany were closed early in this month. The total quantity sold was 14,000,000 tons of a total value of about 350 million marks, and for delivery over a term of years. The works participating in this large purchase are: Deutscher Kaiser, Gutehoffnungshuette, Rheinische Stahlwerke, and Friedrich Krupp (for the new basic works at Rheinhausen). The ore is phosphoric, and will be shipped principally from the well known deposits in Swedish Lapland. The annual shipments of Swedish magnetic ore, chiefly phosphoric, amount to about 2,000,000 tons.

The B. F. Sturtevant Co. announces the removal of its entire plant from Jamaica Plain to its new works at Hyde Park, Mass. Nine acres of floor space are devoted to the manufacture of the Sturtevant products: blowers, engines, motors, economizers, forges, steam heating, ventilating and drying apparatus.

FOUNDRY ACCOUNTING.*

BY KENNETH FALCONER, MONTREAL, P. Q.

That cost accounting presents in the foundry, problems not met in the machine shop, and difficulties not found in relation to other branches of manufacture is undeniable; possibly in no other industry does accurate "cost finding" imply so much attention to details, or necessitate such minute analysis of expenditures incurred. Like many apparent evils, however, this carries its own compensation. The end of cost accounting is cost reduction, and in any line of manufacture the possibilities of "cost reduction" are in direct proportion to the detailed knowledge available, and to the minute analysis made of the various elements which go to make up the cost of product. In other words, the special difficulties of finding the cost of the output of the foundry, give the results obtained special value as a means of lessening the cost.

The relative importance of the principles underlying "cost accounting" will depend very largely upon which word the emphasis is placed—upon whether the subject be regarded from the view point of the manager or the accountant. Too often the value of the results obtained is lessened by failure to realize that the question involved does not alone concern the matter of costs but that the best results can only be obtained when it is regarded as the science of accounts applied to the manager's problem of costs. In cost as in any other field of accounting, it must be remembered that for every charge made there must be a corresponding credit; that each account must stand for something, not only definite, but also definable; that the balance of any account whether debit or credit must represent an asset or a loss, a liability or a profit. If these be borne in mind the efficiency of the "cost system" and the value of the accounting results will both be increased.

Distribution of

Foundry Pay Roll _____ *Week Ending* _____

NAME	No.	Molding A	Molding B	Molding C	Molding D	Furnace Men	Pattern Stores	Fettling	Floor Labor	Metal Room	Core Room			
Total Hours														
						Form 1								

In the business of making castings as in any other productive industry, the cost of each individual article produced is composed of three elements—material, direct labor and a proportion of each manufacturing expense incurred on account of or resulting from its manufacture.

It is only in exceptional cases that the conditions prevailing in the industry represented at this convention will permit of making each article the subject of individual record as regards any one or all of these elements. Leaving these cases aside, the alternative is to divide the output along what may appear the best lines into classes, and as far as possible make each class the subject of individual record as regards not only each element of cost, but each item forming each element. To do this all the elements of cost for a given period, say one month, must be divided by the gross weight of those classes of product on account of the manufacture of which each has been incurred, thus giving a factor of cost per 100 pounds applicable to a certain part of the product. For instance, if we assume that the weight of casting produced during a month, be divided into three "main classes" each of which is further divided when received from the foundry, into three sub-divisions, it is clear that we have nine distinct lines of product amongst which to distribute the material consumed, the wages paid and the shop expenses incurred; this quite irrespective of whether the lines of division are based on the weight of the individual castings in each class, or the quality of the metal forming them, on the proportion of molder's wages paid for their making, or partially upon each.

*Read at the Indianapolis meeting of the American Foundrymen's Association, June, 1904.

If the three elements of cost be divided to as great detail as practicable, if each kind of material, each class of labor, and each item of shop expense for a month be recorded separately, each can be distributed on the cost of that part of the output which should rightly bear it without affecting the cost of other lines to which it bears no relation whatever.

The foundry "cost system" here described represents part of a complete system of "shop accounting" designed on these lines for a large brass works. "Anything in Brass" is the claim of the proprietors when asked the nature of their output, and it will readily be seen that the resulting conditions as they affect the foundry make a correct system of cost finding particularly difficult of application and also very essential to success.

Metal Report *Date*_____

		BIN A		BIN B		BIN C		BIN D			
		WEIGHED IN	OVER	WEIGHED IN	OVER	WEIGHED IN	OVER	WEIGHED IN	OVER	WEIGHED IN	OVER
Copper	G.O. Ingot										
	XX "										
	Hvy. Scrap										
	Scrap										
	Light Scrap										
Brass Scrap	Red Hvy.										
	Red										
	Light										

Form 2

It was found absolutely impossible to secure foundry costs by the plan of making each casting a subject of individual record in the foundry, and equally impossible to issue individual orders for the production of each lot of similar articles, and charge to such orders the labor and material directly expended on their manufacture. The fact that on a certain date there were over 1,000 unfilled orders on the foundry order book, and that of these considerably over 700 had been put in hand, and some part of the goods called for delivered to the shops or stores, will show that the keeping track of each day's expenditure of time and material on each individual order was out of the question.

The output is divided into classes designated by the letters A, B, C, D, etc., the class to which any casting belongs

Output from Foundry

*Date*_____ *To*_____

		MONTH	
		Preceding	Current
Castings	A		
	B		
	C		
	D		
Gates	A		
	B		
	C		
	D		
Bad Castings	A		
	B		
	C		
	D		

Form 3

being determined solely by the metal of which it is composed.

Form 1 is a weekly time report and represents the time of all upon the foundry pay roll.

Form 2 is known as the foundry metal report, and must account for all metal melted each day. (Other supplies used each day in the manufacture of castings, and also the general supplies used in the foundry and given out from time to time are reported on similar forms.)

By the system of shop orders the fixed charges and the cost of maintenance for each month are accurately kept track of. These expenses, and also those represented by the consumption of general supplies are incorporated in the cost of the castings on the basis of a charge per hundred pounds. The amount so charged may not agree each month with the actual expenditures of this nature, but spread over a number of months have been found to very closely balance them. The aggregate of this charge against the cost of output is credited to an account known as "cost advance" to which the expenditures mentioned are charged out each month, and the rate adopted has been so closely figured that during a period of several years it has only been necessary to change it four times, and, *this is the important point,* in each case the reduction in the rate used has borne a direct relation to and resulted from the normal increase of the output from the foundry.

Form 3 in a card which accompanies any output of either good castings, gates or bad castings. As they reach the office these cards do not represent a full day's transactions, but, on the contrary, are merely reports of each lot or box of the good castings sent to the storeroom, or the bad castings and gates returned to the metal room. (It might be here noted that bad castings are credited to manufacturing account at the value of good castings, even though the defect be noticed before they leave the floor of the casting room. They are then charged back from the stores at the same price to a record account known as "defective work"—afterwards being transferred from "defective work" to "metal stores" or "scrap." "Defective work" account thus represents, on the debit side, the actual cost of the defective castings; on the credit side their value as scrap—the balance of course being the loss caused by defective workmanship.)

The double ruling on Form 3 for current and preceding month is to provide for accurate records of each month as distinct from those preceding or following. The entire quantity of casting molded in January may not be through the fettling room and reach the stores, in the case of good, or the metal-room, in the case of bad castings or gates until some part of February has elapsed, and the supplying on these forms of parallel columns to indicate whether the weights refer to the current or to the preceding month was found to be more satisfactory than using different cards for each.

The final record of the cost of output is made after the values and amounts represented on the other forms have been grouped together and tabulated by the cost department, and in view of the relation of each class to each expenditure of material, wages, as expense. It will be noted that the gates and bad castings are kept record of according to the class of the output of which they form a part. Their value is deducted from the charge for material against each class of castings at the average value per pound, as represented by the different metals composing the various classes. There is not so much clerical work and weighing necessitated by this system as would at first sight appear. The metal as issued from the metal room is placed in a set of shelves and bins lettered A, B, C or D, according to the class of castings in the manufacture of which it is to be used. At the close of the day, the amount left over in each bin is weighed and entered in the column marked "over" the amount supplied during the day being entered in the column headed "weighed in"—any metal left over in the crucibles is run into ingots and placed in the bins. The weight is marked in the column for "overs" and the value at which the cost department figures it is based upon the average cost of the metal of which it is formed. On the following day the foundry department makes no record on Form 2, of the amount left over in the bins from the preceding day's work, but simply enters the amount supplied and

the "overs" for that day. The cost department, in making up their figures add what is over the preceding day to the amount supplied on a given date, and deduct what is over at the close of the day, thus getting their net charge for the metal used each day for each class of product.

This cost system has been found of very practical value, but it is not as complete as the management hopes to make it. The ultimate intention is to further subdivide the output, distinguishing between machine made and hand made castings, between cored and solid castings, and between castings made from the firm's own, or the customer's patterns, each of these subdivided into the qualities represented by A, B, C, D, etc.

PIG IRON AND ITS ELEMENTS.*

BY H. L. WILLIAMS, CHICAGO.

We find pig iron and castings made up in the main of metallic iron, carbon silicon, sulphur, phosphorus and manganese. The other elements, such as titanium, copper, arsenic, etc., seldom being important enough to cause trouble.

Metallic iron runs 92 to 94 percent in our foundry and mill irons. It is the same whether in pig iron, steel, wrought iron, castings, etc. Were it alone to be considered we need not worry about grading by fracture or analysis. We must look for the differences that occur in the various classes of irons, in the additional elements present. To control these foreign elements is the task of the founder.

Carbon is most important in cast iron. Its effect on iron is positive and varied. Free carbon, or graphite, may be either in the pig iron between the crystals, or if in considerable excess, leave the iron at the moment of set, and fly off as "kish." Combined carbon, or the carbon which remains in combination with the iron is the hardening substance in iron, and when all the carbon is present in that state, leaves it perfectly white. This is turned to practical account in making chilled castings, the effect of a sudden cooling of iron by throwing into water, or casting against a heavy body of cold iron promoting the retention of the carbon in the combined state. In this way car wheels, crusher work, rolls, and the like are made, with iron otherwise gray if left to cool slowly. If a casting is too hard a correction must be sought in freeing more of the carbon and getting it into the graphitic state in subsequent castings. Hence softness and hardness of iron in foundry work are chiefly controlled by carbon.

Silicon in iron frees the carbon, depending upon the amount present, the shape and weight of the casting, and the pouring temperature. In other words, the rate of cooling. If the iron is high in combined carbon and hard, add silicon to soften it. It will do this unless prevented by too much sulphur phosphorus, or manganese. If the iron is too soft, reduce the silicon. If the iron is too hard, and low in total carbon, too much silicon is not good, as it is only effective through its action on carbon.

More silicon is required in thin castings than in heavy ones, as the latter cool slower, and give the carbon time to separate out, while the former cooling quickly chill more, and keep the carbon in combination.

Manganese increases the affinity of iron for carbon. In heavy castings it is well to have 0.80 percent, and in light work only 0.50. With these proportions the metal will be clean and strong. Below 0.50 the metal is inclined to sponginess, and above 0.80 there is a chance for hard iron. Manganese also reduces the sulphur present. In chilling work, high manganese gives a strong, hard, sharp chill. It can be used up to 3 percent in such mixtures.

Phosphorus increases fluidity, corrects shrinkage, and is desirable in the foundry up to 0.50 for ordinary foundry castings, and up to 1.25 for ornamental products. Phosphorus hardens iron, and very much of it requires plenty of silicon, to neutralize the effect. Excessive phosphorus with low silicon makes bad foundry work.

Sulphur combines carbon, erratically causing hardness, closing the grain, and weakening the castings. In ordinary castings it should not exceed 0.09, but may go above this in common work requiring no machining. It is the great enemy of iron and should be kept out as much as possible. The fuel is a fruitful source of sulphur, hence this should be watched.

It will be noticed that silicon opens the grain of iron by freeing the carbon, while all the other elements close it by retaining the carbon in combination. In these effects we find the relation of grading by fracture and chemical analysis.

* Read at the Indianapolis meeting (June, 1904) of the American Foundrymen's Association.

THE ENGINEER IN THE FOUNDRY.*

BY DR. R. MOLDENKE, WATCHUNG, N. J.

It is not so very long ago that when an engineer had to do some detailing in which cast iron was used, that he simply figured on a strength of 10,000 pounds per square inch, and let it go at that. Today more is required of a man up in his profession. Where the use of cast iron is advantageous, it makes quite a difference whether ordinary cupola metal is employed or the highest grade gun metal. In other words, the engineer should know something of the several kinds of cast iron made, how they are made, and how used to the best advantage.

The best indication of this modern tendency is seen in the recent presentation of specifications for testing cast iron and finished castings. These arose from the demand of the buyer to know what he is paying for, and as a consequence he is learning to specify his wants more clearly. Then also there is the desire of the engineer to acquaint himself with a material he is called upon to inspect for the buyer, and pass upon as good for the purpose or not. Finally the foundryman himself, in his most broad-minded form, has always been desirous of giving the customer the best he can make, and indeed must do this or find his product replaced by the malleable or steel casting. All these tendencies have brought about a general getting together of those most interested, with the result that for the first time in the history of the iron industry has a common ground been found for working specifications governing the testing of cast iron and its products. We will therefore look into this subject more closely, and see how the engineer can utilize his knowledge of metallurgy in dealing with the foundry.

For the purpose of the engineer we can divide the general subject cast iron into the following heads: The metal without subsequent extended annealing, or all classes of cast iron proper; and with subsequent extended anneal, or malleable cast iron. I say extended anneal to distinguish the removal of the casting strains simply in any kind of casting by the application of moderate heat for a short time only, from the long annealing given a special class of white iron which is unfit for use in its condition as it leaves the molding floor, but becomes tough and malleable as well as just short of steel in strength after the heat treatment has been applied.

Cast iron may be further divided into the gray varieties, and the chilling irons. The gray varieties may again for our purpose be divided into the ordinary jobbing castings, such as for buildings; the machinery irons, light, medium, and heavy; the special irons made in the furnace, which run up to 35,000 pounds per square inch and over; and finally the softer irons, such as would find their best application in ornamental work. Stoves, art castings, novelty work, etc., would come in here. There are some subclasses to be considered here, such as iron for pipe cylinders, refractory metals for grate bars, and the stuff only good for sash weights and floor plates.

In the chilling irons we find first the car wheel iron, which is both soft and hard, depending upon the mold it has been cast into; the roll irons; and special work such as for crusher jaws, grinding mills, and the wearing parts of machinery.

It will be easily seen how the civil engineer will be specially interested in cast iron going into railroad and bridge construction, whether for actual working parts, or merely the ornamental end. Similarly in the designs of buildings, whether terminals or sky scrapers. The mechanical engineer naturally has more to do with cast iron and runs through the whole gamut in his daily practice. In the railroad service he deals with malleable as well as gray iron castings in his car construction. The locomotive adds some steel castings to these. Then the cast iron car wheel will give him enough to think of, as will be seen from the specifications alone. In the machine shop, rolling mill, and in the foundry itself, the mechanical engineer should be a master in adapting this metal, in its various forms, to the purpose in hand, and hence he cannot learn too

* Read at the Indianapolis meeting (June, 1904) of the American Foundrymen's Association.

much of the production of all classes of castings, gray, chilled, malleable and steel.

Finally the mining engineer, who has probably to suffer most from breakdowns with iron castings, as he is always isolated and must transport his repair parts great distances. He also should know something of foundry practice, as he could oftentimes help himself by "burning on" a broken piece, if he but knew how to rig up a temporary cupola out of an old boiler shell, and drive compressed air into the charge.

Some distance across the border down in Mexico, I saw a foundry which made it a business to cast repair parts for the various mines tributary to the city wherein it is located. This foundry used but little pig iron and much scrap, the scrap being inferior, and the pig iron worse, the result is not to be wondered at, and hence it is the custom to send a duplicate order to the States for the same piece, which usually arrives just when the Mexican casting breaks. Had some of our young engineers in such regions knowledge of foundry metallurgy, they could take charge of the foundry for the time being and get creditable results, and the double expense and vexation would be avoided.

Taking up first the pig irons, in the light of the specifications governing their purchase, we note that the charcoal irons form a special class by themselves. The cold, or moderately warm blast used, together with the more perfect reduction of the ore, produces an extremely sound and strong metal which cannot be always duplicated in the hot blast coke process. This iron, therefore, goes into the highest grades of castings, and cannot well be covered by ordinary commercial specifications governing the great bulk of the pig iron made. Similarly the high silicon irons, and the ferro-silicons are a class by themselves. Being used only in very limited quantities, their impurities are not so important, so long as there is a great preponderance of silicon for mixing purposes.

Two cardinal requirements are laid down in specifying for pig irons. The content of silicon and of sulphur for the grade numbers known to commerce. These are as follows:

Grade.	Silicon.	Sulphur.
No. 1	2.75 percent	0.035 percent
No. 2	2.25 percent	0.045 percent
No. 3	1.75 percent	0.055 percent
No. 4	1.25 percent	0.065 percent

A clause is added to the specifications intended to take up the personal equation in sampling and in the analysis of the sample, a lee-way of 10% being allowed in the silicon, and 0.01 in the sulphur that may be above the table. This variation may be doubled before the iron can be rejected, but a penalty is provided, thus reducing the cost to the buyer. While this penalty is small, yet it is only fair to the furnace man who has so many kinds of iron to pile up and care for, while the foundryman can always help himself with the iron he receives by judicious mixing. The better posted the foundryman is, the more liberal he will be with his pig iron dealers. Personally, I have never rejected a car load of iron in my life of the several hundred thousand that have passed through my hands, but once in a while there have been heart to heart talks with te agents, resulting in concessions in price, and the iron was suitably mixed up and used. With these specifications and the assistance of a commercial laboratory, even the most back-number foundryman can get suitable iron for his castings, without relying upon the uncertain fracture appearance of a freshly broken pig, as he has done heretofore.

Perhaps the most important of the specifications from the standpoint of the engineer, is that for testing cast iron as a metal. This is the result of years of thought and experiment by engineers' and foundrymen's associations, as well as independent investigators, thoroughly digested by those who were most active in this work, and the result approved by a majority of the cast iron experts of the country. The following principles were recognized. In America we prefer to judge a casting which cannot be tested to destruction, by the quality of the iron entering into it. That is to say, by pouring the melted iron into test bars, under standard conditions, and then testing these bars to form conclusions therefrom. Next it is recognized that these bars should be made of as large a section as possible, consistent with a proper structure, or constitution of the iron, to avoid the artificial influences of damp molding sand, variations in pouring temperature, cooling strains, etc. Also to keep the tests within the limits of the ordinary testing machines found in our foundries.

Then comes the cross-section of the bars, the round form being better than the rectangular, as it avoids the artificial cooling at the corners. Next the manner of casting. Experience has shown that a bar cast flat, when tested in the position as cast gives different results from those obtained when the bar is reversed. Hence the importance of casting the bars vertical. The refinement of the bottom pour, though giving better results, is too cumbersome for commercial use. A suitable rotation in the casting of these bars is necessary, so that the results may be representative. The bars are not to be tumbled, as this would remove casting strains, and make the material artificially strong when compared with the castings themselves, which are not so treated. Finally comes the testing of the bars themselves, which experience has shown to be best accomplished by placing them upon supports 12 in. apart, and breaking by applying the load at the centre. The deflection is also noted.

The best way to test castings is to take, say three out of a batch of 103, all being made from the same heat and under the same conditions, and actually breaking them under as nearly service conditions as may be. For instance, the car wheel is now so tested in practice, not only by using the drop weight on it until shattered, thus giving the extreme of the pounding it would get in service; but by pouring around the chilled rim, a stream of melted iron, and noting the effect. Here again the extreme effect of the brake is applied to the wheel. If the three wheels thus treated will come up to expectations, the other 100 are accepted. Thus it will be seen how careful material is looked over where life and property hang in the balance. In making boiler castings, everyone of them should be subjected to the hydraulic test, and put under pressures at least 2½ times as great as the one to be kept up in actual service. If on going over the castings carefully during the test, they stand up all right, they may be regarded as safe. Similarly a number of classes of other castings are tested under actual service conditions with very good results.

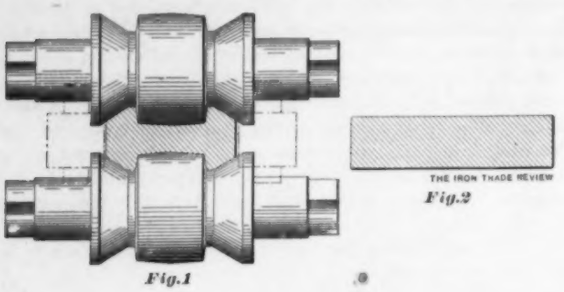
The great bulk of castings, however, do not lend themselves to such tests, and hence it is necessary to pour bars to judge the iron as poured. The art of the founder should then insure the quality of the castings made to be as nearly that of the test bars. This, of course, is not always the case, but the buyer soon learns where he can get the best work suited to his requirements, and hence the incentive on the part of the founder to do the best possible for him. With a good iron as shown by the test bar, it is possible to make bad castings, but with a bad iron as shown by the test bar, it is not possible to get good castings. Hence our American method of giving the test bar the best chance possible, in order that one gets a correct idea of the situation, and can size up the founder's ability to do good work, or his judgment in buying good or bad irons. There is nothing better than to have the foundry laboratory open to the free use of the inspector, so that he can see the shop tests before him all the time, whether for his work, or that of the general run. This creates confidence, and invites suggestions for betterment all around.

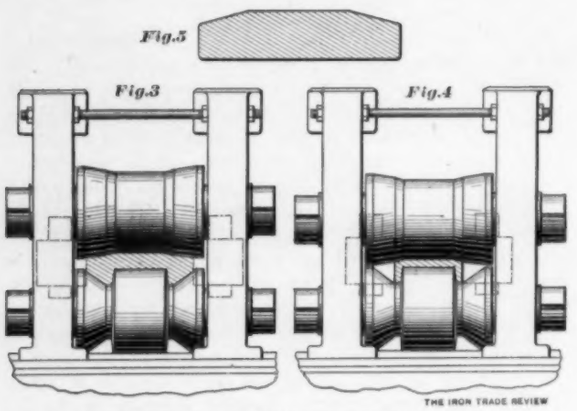
One of the things the engineer should know is when and where to use cast iron. I have always felt that this material has no business in structures where life may be endangered in case of accident, other than in the ornamental portions. The cast iron bridge member is now fortunately a relic of the olden times, and gradually cast iron has been replaced by steel where lightness and strength is an object. These tendencies can of course be carried too far, for there is no economy in using expensive steel construction in places where cast iron will do just as well. Wherever there is a quiescent load, which requires a material with high crushing strength to sustain it, there cast iron will be found most valuable. Wherever art work is to be added to the cold and bare constructions of the engineer, there cast iron is essential. The fact that last year some 3,600,000 tons of castings were made here shows what this industry means to our country.

I therefore commend the foundry to the engineer's most earnest attention, as he can hardly turn about in his professional work, without coming into contact with its products. With the excellent literature now available in this branch of the arts, with a progressive technical press, and the welcome he will get in visiting foundries, there is no reason why an engineer should not be well posted on cast iron and thus make experience serve him all the better in the daily problems of his profession.

NEW METHOD OF ROLLING STRUCTURAL SHAPES.

Wm. A. Dunn, of Duluth, Minn., has patented in this country and in Canada, Great Britain, France, Germany and Belgium a new process for the manufacture of girders, I beams, tees, channels and angles. This process is designed to increase the cross section of the article rolled above limits at present practicable. It consists essentially in subjecting the





NEW METHOD OF ROLLING STRUCTURAL SHAPES.

ingot or slab intermediate of its sides to roller pressures exerted in a vertical direction, in subjecting the sides of the slab or ingot to pressures exerted in a horizontal direction, and simultaneously with the vertical pressures applying roller pressures to the side edges of the slab in an inward direction and at an abrupt angle to the horizontal.

Processes now in use put much closer limits than does the new method, on the extent to which flanges can be forced out. There is now no side work on the flanges to build them up.

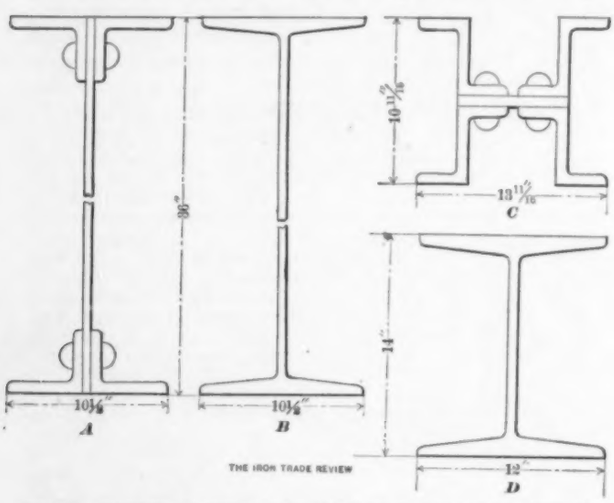


FIG. 6.—PROPOSED SPECIAL BEAMS TO TAKE THE PLACE OF BUILT-UP GIRDERS AND Z-BAR COLUMNS. B TO REPLACE A AND D TO REPLACE C.

They have to be formed by horizontal pressure directly on the web of the beam, thus forcing metal laterally into flange grooves. This pull on the flanges by the grooves reduces the former every pass instead of building them up; and it is the heavy slope required on the flanges to permit metal to enter the grooves easily that gives the comparatively heavy sections produced by present methods. By the beveled roll which is the most important feature of Mr. Dunn's patents he claims to be able to remove some of the limitations of present-day rolling. He claims that his mill is capable of producing a much greater product than can be turned out at present by mills making the same material, and that with less labor and with but half the weight of rolls usually employed.

By this process a 24-inch beam has been made as light as 63 pounds to the foot, against the common standard of 80 pounds, the difference being entirely in the thinness of the flange close to the web, where weight is not especially needed. Beams up to 24 in.; columns to 6 x 6 in. and to 14 x 12 in., to take the place of Z-bars; girders up to 36 in.; channels up to 24 in., with 6 and 7-in. flanges, angles and tees, slitted by a simple device in the final passes, from channels and beams —these are among the shapes that it is claimed can be made advantageously by this mill. Mr. Dunn suggests that by slitting channels and beams into angles and tees double the product can be got that is produced from any bar mill, besides doing away with the blooming mill. The mill is universal and will roll plates.

It is well known that the closer housings are to each other the less strain is brought on the center of the rolls and the less danger there is of broken rolls. The proposed length of the Dunn roll for making 24-inch beam blanks is 46 inches between necks, against 93 inches commonly.

An advantage claimed for this process is that it will give a beam of much lighter weight than now produced for the same web section; also that the process gives a greater product than other mills in the same time and with less labor, and that it makes the various sizes and shapes mentioned.

One of Mr. Dunn's several patents covers a rolling mill and cutter. The special feature is that after the wide beams or channels, which it is possible to roll on the type of structural mill referred to above, make their last pass through the regular rolls they go to a finishing machine, which consists of a pair of rolls in which centrally of each roll are introduced cutter blades. These slit the beam into two T's and the channel into two angles as each passes through. This invention reduces the number of passes of the metal, diminishing the cost of production and increasing the output and by the peculiar form of the cutter blade employed finishes the T or angle. In addition, the central portion of the beam or channel which the slitting operation cuts out is saved and has such a shape in cross-section as enables it to be rolled into rods of circular or other sections.

In the accompanying illustrations Fig. 1 is an elevation of a set of shaping rolls for forming I beams by the Dunn process. Fig. 2 is an enlarged cross-section of the slab preferably employed. Fig. 3 shows a proposed set of rolls for forming channels. Fig. 4 indicates the shape of the metal after repeated passes. Fig. 5 is a section of the slab suggested for a mill rolling channels. Mr. Dunn has been a roller at Homestead and Joliet.

Publications Received.

The pneumatic tool department of the Ingersoll-Sergeant Drill Co. has issued an attractive pamphlet containing a full description with illustrations of the construction of the Haeseler "axial valve" hammers. Reference is also made to the scope of a recent decision of the Supreme Court bearing on patented features of pneumatic handles.

Supplement No. 2 to catalogue No. 77 of Arthur Koppel, of New York, announces an arrangement with the Baldwin Locomotive Works, of Philadelphia, by which the former will sell the Baldwin locomotives in connection with the contracts he takes for the construction and equipment of narrow and standard gauge railroads. These locomotives will be furnished for steam, electricity or compressed air. The supplement illustrates and gives details of 11 different types of locomotives commonly used for industrial purposes.

The Northern Iron Co., of Port Henry, N. Y., has awarded the contract to the Amsler Engineering Co., of Pittsburg, for the relining of its blast furnace and four stoves. The Amsler Engineering Co. has also secured the contract from the McClure Tin Plate Co., Washington, Pa., for rebuilding its sheet and pair furnaces.

LAKE SUPERIOR IRON MINES.

A much better feeling exists on all the Lake ranges since the close of the lake deadlock, and since mines began to operate at wholesale and railroads to run their summer ore schedules. The doubt that had troubled business men is past and they look for an excellent year and for an active season in 1905. All ore roads are now running trains at high pressure, and shippers and vessel owners are worrying because they cannot run them faster and handle more ore. The two leading lines in the lake region are the Duluth, Mesabi & Northern and the Duluth & Iron Range; these two are handling a combined daily tonnage of about 80,000 tons. They are both properties of the U. S. Steel Corporation. The Great Northern, also reaching the Mesabi range, is not yet moving as great a tonnage as either, or as it will when independent mines upon which it relies for tonnage are further along. With the loss of Chisholm and Clark, which now ship over the Duluth, Mesabi & Northern, and of the Sharon, Sauntry, Penobscot and others, which have been taken into the Steel Corporation camp, and in accord with its policy of closing properties held in fee ownership and without royalty, the Great Northern has been reduced materially in proportionate tonnage for the present. This will be made up in a year or two, however, for there are several future big shippers that will soon be turning their ore to the Great Northern. The efforts this road has made in the past few years to secure tonnage have been carried on with the utmost skill and have insured it a traffic of wonderful proportions for a long term of years.

Steam shovels are working in Gogebic range stockpiles at the Norrie, Pabst, Tilden, Aurora, Brotherton, Colby, Montreal and Ashland mines. On the Marquette range there are shovels loading at the Cleveland Cliffs, Lake Superior, Queen and Negaunee. On the Menominee at the Chapin, Aragon, Penn mines, Pewabic, Crystal Falls, Tobin, Hemlock, Loretto and elsewhere. On the Vermillion at every mine except the Minnesota, and on the Mesabi, everywhere.

All mines of the Vermillion range that were closed in April have resumed. There were five of these, and they are now employing 1,100 men. The former superintendent of Chandler and Pioneer is still in charge, as the company could not make any change and the former scale of wages prevails. There will be no reduction of mine wages among mines of the Oliver company this year, whatever others may do.

Biwabik mine is stripping steadily on the north side of the big pit and in through cut on the east. The mine is likely to ship about 450,000 tons this year.

Croxton, Morrow and Leetonia mines, of the Sellwood syndicate, have begun shipments. Their Pearce and Columbia are released and idle. Morrow and Croxton are open pit and shaft mines; Leetonia is a steam shovel property.

Higgins mine, of the Chemung purchase, is being prepared for large work, and stripping for a milling pit is going on day and night. The mine is already equipped with machinery, but will probably not mine much this year.

The state of Minnesota has placed a man at the Pool mine, which it owns and which is being mined by steam shovel this year, for the purpose of checking shipments. This is the only state mine that will do much in 1904, as the Grant is idle, the Minnewas is dismantled and has been for ten years, the Oliver will only ship its minimum of 5,000 tons and the Elizabeth is idle after having sent out a trial cargo.

The Wisconsin & Michigan railroad is preparing to enter the ore-carrying trade of the Menominee range on a more extensive scale. It will shortly put on additional service from mines to its ferry docks at Pestigo. It is constructing tracks into the Aragon and other mines of the United States Steel Corporation and other properties at Norway and vicinity, and will soon have its main line so far completed that it can build into Chapin, Pewabic and other large mines of Iron Mountain.

Preparations are under way for resumption of the Helen mine of the Lake Superior Co. at Michipicoten. Charles E. Seelye will be in charge.

The Jones & Laughlin Steel Co.'s Lincoln mine, at Virginia, Mesabi range, has accumulated a stock of 75,000 tons since resuming operations recently. The company's Lake Angeline mine at Ishpeming has been diminishing its force, and the Grant will not operate this year. A complete electric haulage system has been put into use at the Lincoln mine, which will produce about 350,000 tons this year.

The Mary Charlotte and Breitung mines, Negaunee, will be closed. The owners prefer to stop mining rather than sell at current prices.

The Oliver Iron Mining Co. has ordered the pumps pulled from the McGillis mine at Iron River, Mich., and water is now rapidly filling the openings. This mine was recently leased by the company, and it is supposed that the lease was made because to close it down under a lease would be cheaper than to operate it with an option.

Agreement to Stay Out of Business Held Valid.

In the case of the Pittsburg Valve, Foundry & Construction Co. against George E. Klingelhofer and others of Pittsburg, affiliated with the American Foundry & Construction Co. of the same place, an order was issued by the court restraining the defendants from engaging in the foundry, machine, valve and pipe fitting business within the United States east of the Mississippi river, and particularly from engaging in the business with or in the employment of the American Foundry & Construction Co. for a period of ten years from Oct. 3, 1900, without the consent of the plaintiffs. George E. Klingelhofer was directed to pay the costs, while the bill against Charles A. and W. L. Klingelhofer was dismissed. The Pittsburg Valve, Foundry & Construction Co. was organized in 1900 and the defendant, as secretary of the Pittsburg Valve & Machine Co., Ltd., represented that concern in the negotiations for the consolidation. George E. Klingelhofer was elected manager of the new company, but in 1901 a dispute arose between himself and the directors of the company which resulted in his resignation the following spring. The Pittsburg Valve & Construction Co. was then organized to carry on the same line of business as the Pittsburg Valve, Foundry & Construction Co. Klingelhofer's contention was that he was not bound by the agreement which he had entered into, promising not to engage in a competitive line of business for ten years.

Freight Tariff Revision on Iron and Steel.

A special meeting of the committee on iron and steel rails was held in Buffalo on June 24 to consider the revision of freight rate schedules on iron and steel rails and steel products in central and trunk line territory. Upwards of sixty prominent freight officials were present, representing the steel carrying roads, members of the Central Freight Association and the Trunk Line Association. Considerable dissatisfaction with the existing rate sheet had developed at various steel producing points, the claim being made that undue concessions had been secured to Buffalo and some other centers. The session lasted several hours, and the rates from Chicago, Lorain, Huntington, W. Va., and Buffalo were considered and a number of changes, but none of special importance, were made. The rates from Buffalo were virtually unchanged, but the rates from upwards of 400 other points were revised to meet the Buffalo rates. An adjournment was taken until October, when another meeting will be held in Buffalo.

The Howard Iron Works, Buffalo, manufacturers of electric and hydraulic elevators, printers and bookbinders' machinery, etc., have completed and taken possession of their new foundry building and are converting their old foundry building into an addition to the machine shop, making the latter 400 feet in length. A new blacksmith shop is also being added to the plant. They report business as showing perceptible improvement during the past few weeks and have a large number of orders on hand. Among those in the elevator department are four hydraulic elevators for the remodeled Hamlin building, Buffalo, and two hydraulic elevators for the First National Bank building, Columbus, O.

The Shawinigan Water & Power Co., Shawinigan Falls, Province of Quebec, has awarded to the Westinghouse Electric Co. the contract for a 6,600-kilowatt generator, for direct connection to a water turbine of 10,000 h. p. The contract also calls for two 2,200-volt primary, 50,000-volt secondary transformers. The amount of the contract is about $300,000.

CHANGES IN CANADIAN TARIFF.

The recent announcement of the Canadian minister of finance at Ottawa indicates the changes proposed in the Canadian customs tariff. The most important of these are the lessening of British preference on woolen goods and on twine and cordage, so that nearly all classes of British woolens are made subject to a duty of 30 percent and that British twine and cordage are made dutiable at 20 percent. Instead of 33⅓ percent, the tariff preference on tableware of china, porcelain, etc., of British origin is now made 50 percent and on common window glass 62½ percent. The general tariff on oils—coal and kerosene, distilled, purified, or refined, naphtha and petroleum—is reduced from 5 cents per gallon to 2.5 cents per gallon, while a bounty of 1.5 cents per gallon is to be paid on all crude petroleum produced from wells in Canada. Molasses, the product of countries entitled to the benefit of the British preferential tariff, not to be used for the purpose of distillation, is made free of duty.

The so-called "dumping clause" is a novelty in tariff legislation. By it a "special customs duty" is imposed upon dutiable goods sold for Canadian consumption at less than the market price in the country of production. This special duty is to be equal to the amount of cut in price; provided, however, that it shall not exceed one-half of the customs duty otherwise established in respect of articles, except upon pig iron, iron or steel ingots, rolled iron or steel angles, rolled iron or steel plates, etc., on which items this special duty is limited to 15 percent ad valorem.

The minister of finance stated that the German surtax imposed last year had reduced imports from Germany during the first ten months of its operation, as compared with the same period of the preceding year, from $8,648,600 to $5,367,000. Of raw sugar, 174,000,000 pounds were imported from Germany during the fiscal year 1903. This year that entire trade had been diverted, he claimed, to the British West Indies and British Guiana.

The surplus of revenue over expenditures for the fiscal year ending June 30, 1904, is estimated by the minister of finance at $16,500,000, and the reduction of the public debt during this year he estimates at $7,500,000.

The minister of finance expressed the opinion that before the government should attempt to deal with all the details of a general revision of the tariff it would be desirable to have a commission make a full investigation and report upon the subject, and that the revision, when made, should proceed upon the lines of establishing separate tariffs to deal with different countries. For those countries maintaining a high tariff against Canada there would be a maximum tariff; for low-tariff countries, a minimum or ordinary tariff; and for Great Britain and her reciprocating colonies, the preferential tariff.

German Tool Manufacturers Want Protection.

The Association of German Tool Manufacturers has urged the Imperial Government to prevent the further inroads of American manufactures upon the special branches of its members. It is claimed that in the first quarter of this year the import of tools had more than doubled, having increased from 245 tons to 526 tons, and that in the second quarter the increase threatens to become even larger. They make a special point of the fact that the United States Government levies a tax of 45 percent on German machines, against the German tariff of 5 percent, and they insist that German machines are in no wise inferior to the American and that there is no need whatever for the introduction of American machines and tools into Germany.

The Rand Drill Co. has been awarded the contract for furnishing two large compressors to be used in the central air power plant, 18 miles below Sault Ste. Marie. They will supply air to operate 25 Little Giant rock drills, 4 three-ton cableways and 4 large water pumps. Their combined capacity is 6,600 cu. ft. of free air per minute. The work in hand is for constructing and dredging a two-mile channel in the Soo river, wide and deep enough for the navigation of large vessels.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Montpelier Foundry & Furnace Co., Montpelier, O., has increased its capital from $10,000 to $25,000.

The Toledo Metal Fixture Co., Toledo, O., has been incorporated with a capital of $10,000. The incorporators are: John Milens, C. K. Frankhauser, E. E. Perry, J. L. Acker and James S. Emery. The company has rented a building and expects to purchase new machinery.

The Cragin Foundry Co., Chicago, Ill., has been incorporated with a capital of $50,000 to do a general foundry business.

The American Foundry Co., Leipsic, O., has been incorporated with a capital of $50,000. Incorporators are: W. W. Edwards, J. H. Edwards, H. C. Edwards, E. S. Edwards, John McGlenn, F. D. Rosenberger and O. P. Edwards.

The Chicago Tool & Supply Co., Chicago, has been incorporated with a capital of $15,000, to manufacture pneumatic and electric tools and supplies. Incorporators are: Carl R. Green, George Hayes and Thomas J. Peden.

The Adam Steel & Wire Works, Chicago, have been incorporated with a capital of $50,000, to manufacture metal and wood products. Incorporators are: William J. Adam, Folger Adam and Robert A. Cameron.

The Hoboken Iron Works, Hoboken, N. J., have been incorporated with a capital of $5,000. Incorporators are: Owen Duffy, August Koenig and Timothy J. Dooley.

The Grant Mfg. Co., Bridgeport, Conn., has been incorporated with a capital of $50,000. The company will deal in metals, machinery, tools, etc. Incorporators are: J. G. Kingsbury, Theodore R. Hugo, George B. Thorpe, Fayette C. Clark and E. A Kingsbury, all of Bridgeport.

The Volunteer Disc Plow Co. has been organized at Chattanooga, Tenn., with a capital of $50,000, to manufacture plows. Incorporators are: M. Llewellyn, C. A. Raht, S. V. Weeks, L. H. Llewellyn and R. B. Cooke.

Richey, Brown & Donald, Long Island City, N. Y., will soon be in the market for equipment for their new plant. They will require a number of machine tools to be used for ornamental and structural iron work; also some foundry equipment, including a cupola. The machinery is to be electrically driven. They will also purchase boilers. A site has been purchased 450 x 700 ft. and the firm will erect a main building 60 x 500 ft. Several small buildings which are already on the property are to be remodeled.

The National Bridge Works, New York, recently incorporated with a capital of $70,000, will purchase air compressors, punches and a general line of structural machinery. This company, which is a reorganization of the National Bridge Co., with main offices at 1123 Broadway, has purchased a site at Long Island City, where it will erect a bridge plant. The works will be equipped gradually and it is not expected that any large amount of machinery will be purchased at one time.

The Gardner Convertible Gas and Steam Engine Co., with a capital of $50,000, has been organized at Washington, Pa., by W D. Gardner, George E. Lockhart, J. L. Stright, Elmer Willetts and John W. Hallam. A plant for the manufacture of these engines is to be erected at Washington.

The Wallis Stoker & Mfg. Co., Terre Haute, Ind., recently incorporated, is in the market for supplies required in the manufacture of stokers. It would like quotations on small steam engines of two to ten h. p., suitable for running stokers; on 1¼-inch chilled cast iron balls, rough and ground; also on reducing valves. The company has been incorporated to do a general business in steam specialties, but will, in the beginning, be engaged in putting the Wallis stoker and the Wallis feed-water heater on the market. For some time Prof. Clement, of the Rose Polytechnic Institute, of Terre Haute, has been designing and developing a stoker along the lines of the patents granted to Harry E. Wallis, an inspector for the Hartford Boiler Insurance Co., who for a number of years has made a study of automatic stoking and smoke prevention. A long series of tests has been conducted by the mechanical de-

partment of the Rose Polytechnic Institute, the results showing a considerable saving may be effected and that smoke may be prevented even with the cheapest grades of Indiana and Illinois coal.

The Kerr Turbine Co. has been incorporated at Wellsville, N. Y. Capital $100,000. Directors: C. V. Kerr, Rutherford, N. J.; T. J. Applebee and W. L. Ward, of Wellsville, N. Y.

The Maxwell-Briscoe Motor Co. has been incorporated at North Tarrytown, N. Y., capital $750,000, to manufacture gasoline engines. Incorporators: Walter B. Horn, Hollis, N. Y.; R. Irvin, New York City; and Henry E. Tobey, Brooklyn, N. Y.

Fires and Accidents:—

Fire damaged the plant of the Northwestern Foundry & Supply Co., Detroit, June 18. Loss $5,000 covered by insurance.

Fire in the machine shops and pump works of J. Walter Greene, Peterboro, Ont., June 15, caused a loss of $3,000, partly covered by insurance.

The shaft house and all adjoining buildings at Ontario mine, Park City, Utah, burned to the ground June 21. The fire started in the carpenter shop and spread rapidly through the shaft house and machine shops. Loss, about $500,000. Two hundred men were thrown out of work.

New Construction:—

The Chicago, Milwaukee & St. Paul railroad is erecting a new shop at Davenport, Ia., which will be 40 x 117 ft. The contract for the construction has been let.

The Red Jacket Mfg. Co., Davenport, Ia., will erect a foundry 85 x 200 ft. Complete new equipment will be required.

The Norway Iron & Steel Co., York, Pa., has placed a mortgage of $200,000 on its property in order to make additions and improvements.

The Muskegon Boiler Works, Muskegon, Mich., will erect a new plant of steel construction, with brick or concrete filling between the posts. The building will be 50 x 330 ft.

The Myrick Machine Co., Olean, N. Y., has enlarged its machine shop and doubled the capacity of its foundry.

The Seamless Rolled Steel Pipe Co., Chester, Pa., has prepared plans for the erection of a plant for the manufacture of steel pipe under the patents of W. F. Bartlett, of Philadelphia, and E. C. Kent, of the Philadelphia Roll & Machine Works. The company has offered for sale $500,000 30-year bonds.

Improvements are to be made in the plant of the Lorain Steel Co., Johnstown, Pa. The company is not ready to announce details.

Two new buildings, one 75 x 250 ft., three stories, and another, 60 ft. square, two stories, are to be erected by Wickwire Bros., Cortland, N. Y. The larger building is to be devoted to wire drawing and weaving and the smaller will be used as a machine shop.

The recently incorporated Grant Mfg. & Machine Co., Bridgeport, Conn., is erecting a two story frame plant 40 x 110ft. The company manufactures multiple spindle vertical tapping machines, bench filing machines, screw slotting machines, speed lathes, tool post grinding outfits and general light machine contract work, and also does light special machine work, such as envelope sealing machines, voting machines, typewriter, counting and registering machines. No new machinery is required.

The plant of the American Casting Co., Birmingham, Ala., recently destroyed by fire, will be rebuilt on a larger scale. Considerable new machinery will be installed.

N. W. Harris, owner of the Ocala Foundry & Machine Works, Ocala, Fla., has purchased a new site to which he will move his foundry and machine works. The new plant will be considerably larger than the present one.

Work is progressing rapidly on the buildings of the Wenzelman Mfg. Co., which a few months ago decided to move from Streator, Ill., to Galesburg, Ill. Three buildings are to be erected.

The Hudson Iron Co., 11 Broadway, New York, has been organized with a view of taking over the properties of the Eastern Iron Co., including the Secaucus furnace at Secaucus, N. J. The re-organization has not yet been fully completed. It is not the intention of the company at present to erect a by-product coke plant as has been stated in newspapers, but that may be done later. A considerable amount of money will be expended in improvements. The company controls mines at Gouverneur, N. Y., and has recently acquired others. The blast furnace, which has been idle for some time, will be repaired and put in operation. The general manager is Albert Trinler, who was manager of the Eastern Co. and formerly manager of the National Steel Co.'s plant at Sharon, Pa.

The Briggs-Weaver Machinery Co., Dallas, Tex., recently incorporated, succeeds the Briggs Machinery & Supply Co., which was not incorporated. The company will build an extensive warehouse, plans of which are now being made. Its erection was made necessary by rapid increase of business of the old firm.

The Reading Iron Co., Reading, Pa., has broken ground for its large new pattern shop. This is the first move on the part of the company for the improvement of the Scott works. The plans call for a new foundry and other new buildings.

The Standard Stove Works, Fort Payne, Ala., will remove its plant to Columbus, Miss. The company will be incorporated with $150,000 capital and will erect five buildings.

The Hisey-Wolf Machine Co., Cincinnati, reports business good, and finds it necessary to increase its capacity. It is now looking for a location upon which to build.

The Bartlett-Tewksbury Machine Mfg. Co., Birmingham, Ala., recently incorporated, is building a plant which will be strictly modern. It will be of brick, steel and glass, with gravel roof. No wood will be used in the construction. The equipment will consist of machine tools of latest design, with some special modifications to suit the company's work. The plant will be used exclusively for the manufacture of steam engines and saw mill equipment. The officers are all practical machinery men of long experience. The company expects to be ready for business about July 20.

W. D. Berry, formerly president of the Beaver Valley Metal Co., New Brighton, Pa., has let to R. B. McDanel & Sons a contract for the construction of a brass foundry to be located at the corner of Sixth avenue and Fifteenth street, New Brighton. The main building will be 71 x 38 feet and of thoroughly modern construction. The foundry will have a capacity of 12,000 to 15,000 pounds per day, will be equipped with the best appliances for turning out castings weighing from ½ ounce to 5,000 and 6,000 pounds each, in brass, bronze, copper and aluminum. The other products will be babbitt metals, solder and ingot metals. It is contemplated to have the foundry in running order by July 11 and all contracts have been let to be completed by that time. Mr. Berry has formed a company and will apply for a State charter with a capital of $10,000. Mr. Berry is well and favorably known to the trade.

Holcomb & Millice, proprietors of the Topeka Foundry, Topeka, Kan., have begun the erection of a new foundry. The building will be the width of their three lots and 60 ft. deep.

The Buffalo Veneer Co., Buffalo, N. Y., is to build a new factory, 100 x 154 feet in size, on Elmwood Ave. and the Erie railroad, in that city, and equip it with improved veneer cutting machinery. Later, another building, 50 x 100 feet, will be erected.

General Industrial Notes:—

The Acme Machinery Co., Cleveland, and the Pawtucket Mfg. Co., Pawtucket, R. I., have taken orders for machinery for a plant to be erected at Esperanza, in the Argentine Republic.

The plant of the American Shipbuilding Co., at Lorain, closed down June 25 indefinitely for lack of orders. The launching of the Great Lakes Towing Co.'s lighter Rescue, June 24, was the last boat on contract.

The Rogers Iron Co., Springfield, O., has changed its name to the William Bayley Co. The change does not in any way affect the business. The old directors will continue. The company makes a specialty of decorative metal work. A large quantity of this product has recently been installed in one of the large custom house buildings in Mexico, and in buildings of the Mexico Central railway of Tampico, Mexico.

Lee, Cowan & Bowen, spring manufacturers, Syracuse, N. Y., have sold their business to the Lee, Cowan & Bowen Co., Inc. The company is capitalized at $50,000, of which $15,000 is preferred and $35,000 common stock. Directors for

first year are: Edward H. Burdick, C. H. Knapp, H. L. Stevens, F. B. Gill and Carolyn Lee.

The Elyria Iron & Steel Co., Elyria, O., has closed its plant. It is understood that the suspension will be for a short time.

John W. Davis Jr. and John D. Auld have erected a shop, 25 x 50 feet, at Lombard and Tenth streets, Baltimore, for the manufacture of machinery.

The two Detroit plants of the American Car & Foundry Co., which have been practically idle for several months, are showing signs of activity. At the Peninsular department the force has been increased to 1,200 men to work on the order for 1,500 freight cars for the Pennsylvania system, and by the time this contract is under full way about 2,000 men will be employed. This order will be filled in about two months. The Michigan department is working on repairing alone and employs about 200 men.

The Semisteel Co., Cleveland, whose works are located at Chagrin Falls, O., has made a contract with the St. Paul Brick Co., St. Paul, Minn., to equip a complete plant turning out 27,000 sand lime brick in ten hours. It will require about 15 carloads of machinery to complete this plant. The Semisteel Co. furnishes machinery consisting of engine, boiler, steam connections, mixers, presses, steam hardening tanks, line shafting, pulleys, belting, tracks, brick and transfer cars, turn tables, elevators, rotary sand dryer, conveyors, traveling crane, and all machinery necessary to equip a complete plant.

The Scott National Radiator Stove Co., recently organized at Marion, Ind., will manufacture a new radiating stove invented by Rev. Elwood Scott, of that city. The stove is said to have a very large radiating surface and promises to be a success. Patterns are being made by the Gobeille Pattern Co., of Cleveland, and it is expected that stoves will be on the market next fall. The location of the permanent home of the enterprise has not been decided upon.

D. J. Renaud, who for several years has been operating a brass foundry at Carthage, N. Y., has purchased a plant at Deer River, N. Y., for the manufacture of plows, and will remove it to Carthage.

The McKenna Steel Working Co. has discontinued operations at its plant in Armourdale, Kan. The plant was closed in 1899, but was reopened about six weeks ago. Having finished the contracts on hand at Armourdale, it was decided to transfer some of the working force to another plant belonging to the company at Joliet, Ill. While the plant was in operation 5,000 tons of steel rails were rolled.

In bidding on the pump for the Milwaukee water works recently, the William Tod Co., of Youngstown, O., was the lowest bidder, its bid being $64,600. The Allis-Chalmers Co. was next lowest, being $600 above the Ohio company. The contract has not been awarded, as the city officials are trying to find some plan by which it can be given to the home company.

The Bessemer, Ala., plant of the United States Cast Iron Pipe & Foundry Co. is running full with the exception of the machine department. It has on hand a heavy order for the city of Brooklyn, large contracts for New Orleans and Texas, besides many smaller orders.

The Western Tool Works, Galesburg, Ill., which recently purchased the plant of the George W. Brown Co., are actively at work making the building fit for the installation of new machinery and getting all in readiness for an early start.

The Allegheny Foundry Co., Ltd., Warren, Pa., is a young and prosperous concern which declared its first dividend a few days ago. The officers of the company are: Roy Heermans, president; J. A. Viele, secretary and treasurer; O. W. Ensworth, superintendent.

E. A. Myers, president of the Model Gas Engine Co., Fort Wayne, Ind., made an offer of $30,000 for the property of that bankrupt concern. The offer was not accepted at the meeting of the creditors and the property has been advertised for sale early in July. It is not expected that more than $30,000 will be realized.

The contract for the erection of the South Side elevated branch of the Wabash railroad at Pittsburg has been awarded to the American Bridge Co. About 2,500 tons of material will be required.

The plant and business of the Damascus Steel Co., New Brighton, Pa., has been purchased by Charles Capper, formerly superintendent of the Colonial Steel Co., Colonia, Pa. A new company has been organized under the name of the Damascus Crucible Steel Casting Co., which will operate the plant and in addition to manufacturing crucible steel under the Damascus process, steel castings will be produced.

The Falcon plant of the American Sheet & Tin Plate Co., Niles, O., is being dismantled and the machinery is being shipped to other plants of this company. In addition to the four sheet mills and the galvanizing department, this plant contained puddle, bar and skelp departments.

The National Tube Co., Pittsburg, is accumulating a large stock of material at its Riverside plant, Wheeling, W. Va., preparatory to its summer shut down, which will occur shortly.

The Howard Axle Works of the Carnegie Steel Co., Pittsburg, resumed operations this week after an idleness of about ten days.

The machine shops of the Pennsylvania railroad, at Altoona, Pa., were shut down last week for an indefinite period.

The South Sharon, Pa., wire nail plant of the American Steel & Wire Co. is to be enlarged by the addition of 70 machines. The machines will be installed during the summer shut down.

The Eastern Steel Co., Pottsville, Pa., has secured the contract to furnish the material for and erect the power plant of the navy department, to be established at Washington, D. C.

Blast furnace D, of the Colorado Fuel & Iron Co., which was relined last fall and has not since been in operation, will soon be blown in. It is expected that E furnace, which was recently put into blast, will be blown out for a short time in order that certain defects which have recently developed may be corrected.

O. B. Pickets, representing the Elwood Lawn Mower Co., Elwood, Ind., recently visited Chattanooga, Tenn., to look over the field with a view of moving the plant to that city. On account of the gas supply at Elwood being exhausted, the company is looking for a new location.

The Youngstown Foundry & Machine Co., Youngstown, O., has been incorporated by S. D. L. Jackson, H. Conroy, A. L. Rowland, D. B. Cooper and J. W. Blackburn. This new company is a consolidation of the Youngstown Foundry & Machine Co. and the Youngstown Steel Casting Co., whose plan to unite their interests was announced last week.

The Western Tool Works, which recently purchased the plant of the George W. Brown Co. at Galesburg, Ill., and is moving its present plant from Chicago to the new location, is doing so gradually and the carrying out of contracts is not interfered with. The company will put several new machines on the market, among which are a saw for electrical manufacturers for cutting brass, rubber, fiber, etc.; a double spindle semi-automatic nut tapping machine, a suspension drill press for drilling marble slabs for switch-boards and a self-centering drill press for drilling the wood blocks for rubber stamps. The company also manufactures a hose clamp tool for which there is quite a demand. The company expects in a short time to put on the market a small gasoline runabout which will sell for $500. The new plant will give room for working about 200 men and the company expects to have it in full operation within the next three months.

The Rockford Engineering Works, Rockford, Ill., recently incorporated, succeeds Cormack & Co., manufacturers of engines. There will be no important change in the management of business plans of the concern.

The Geo. L. Squier Mfg. Co., Buffalo, manufacturer of sugar machinery, coffee, rice and general plantation machinery, has a large number of orders in hand both for domestic and export shipment and regards the outlook for future business to be exceptionally good. It has recently shipped a large sugar cane mill to Sunset, La., and is now engaged upon orders for similar equipments for India, Mexico, Honduras, Porto Rico and the west coast of Africa. This company is also building coffee machinery for Argentine Republic, Columbia, India, South Africa and other countries, including an entire equipment for coffee drying for Mexico.

The machinery in the plant of the Flickinger Wheel Co., Galion, O., has been appraised at $19,000. The company is in the hands of a receiver.

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The first logical step toward the purification of any boiler feed supply is to save and utilize all of the available pure water around the plant—such as the condensation of exhaust steam used in heating or drying systems or in closed heaters. Many steam users fear to use this condensation because they do not know how to get rid of the oil with which it is contaminated. But thousands of plants ARE making use of their exhaust and the returns from their heating system. How do they get along without trouble from oil? Why, by using Cochrane Oil Separators. Something like 4,000,000 H. P. of boilers are being protected from oil by these "Cochranes."

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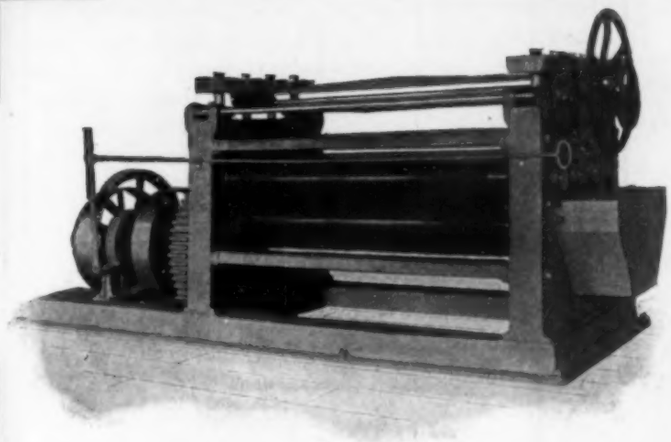

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ST. LOUIS: - - New Bank of Commerce Building
WASHINGTON: - - National Safe Deposit Building
ST. PAUL: - - - - Pioneer Press Building
NEW ORLEANS: - - - Hennen Building

FOREIGN SALES OFFICES:

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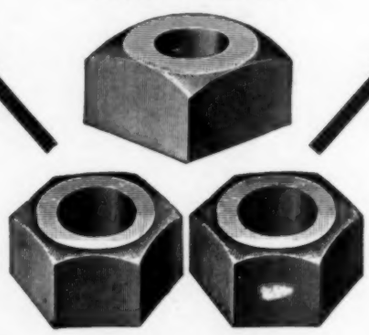

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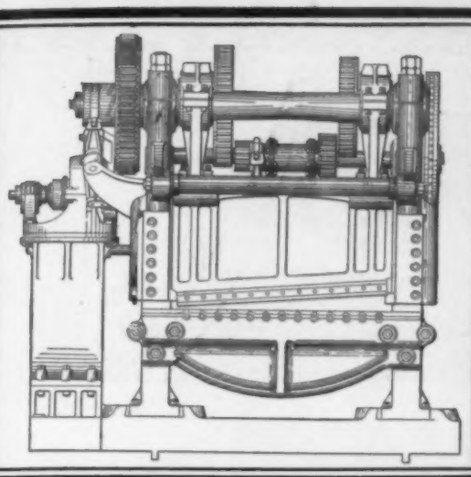

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(ANNUAL CAPACITY ABOUT 150,000 TONS)

ALSO EVERY VARIETY OF

Machine Bolts, Nuts, Washers, Turnbuckles, Lag Screws, Railway and Dock Spikes, Harvey Grip and other Railway Track Bolts. Boiler, Ship and Structural Rivets. Car Forgings and Rods and Irons for Bridges, Buildings, Etc., Etc.

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